tDS-700 Series

User Manual

Warranty

All products manufactured by ICP DAS are under warranty regarding defective materials for a period of one year, starting from the date of delivery to the original purchaser.

Warning

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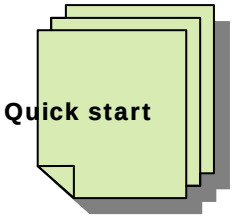
Packing List

The shipping package includes the following items:

- One tDS-700 series hardware module
- One printed Quick Start Guide
- One software utility CD



Note!!

If any of these items is missed or damaged, contact the local distributor for more information. Save the shipping materials and cartons in case you want to ship in the future.

More Information

Documentations

CD:\NAPDOS\tDS-700\Document

VxComm Driver (Virtual COM)

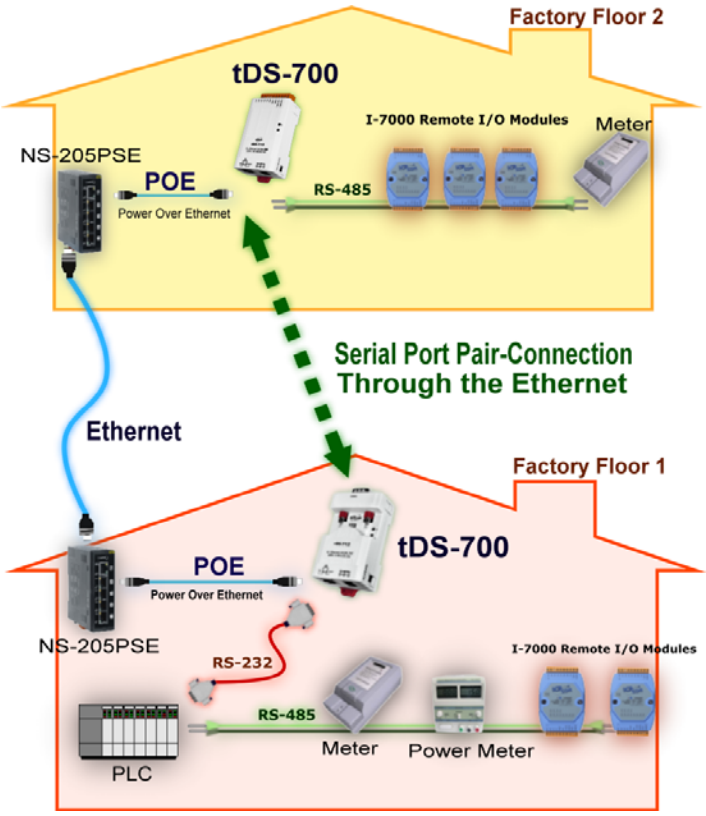
CD: \NAPDOS\Software\VxComm_Driver

Firmware

CD:\NAPDOS\tDS-700\ Firmware

1. Introduction

The tDS-700 is a series of Serial-to-Ethernet device server that designed to add Ethernet and Internet connectivity to any RS-232 and RS-422/485 device, and to eliminate cable length limitation of legacy serial communication. By using the VxComm Driver/Utility, the built-in COM port of the tDS-700 series can be virtualized to a standard PC COM port in Windows. Therefore, users can transparently access or monitor serial devices over the Internet/Ethernet without software modification.

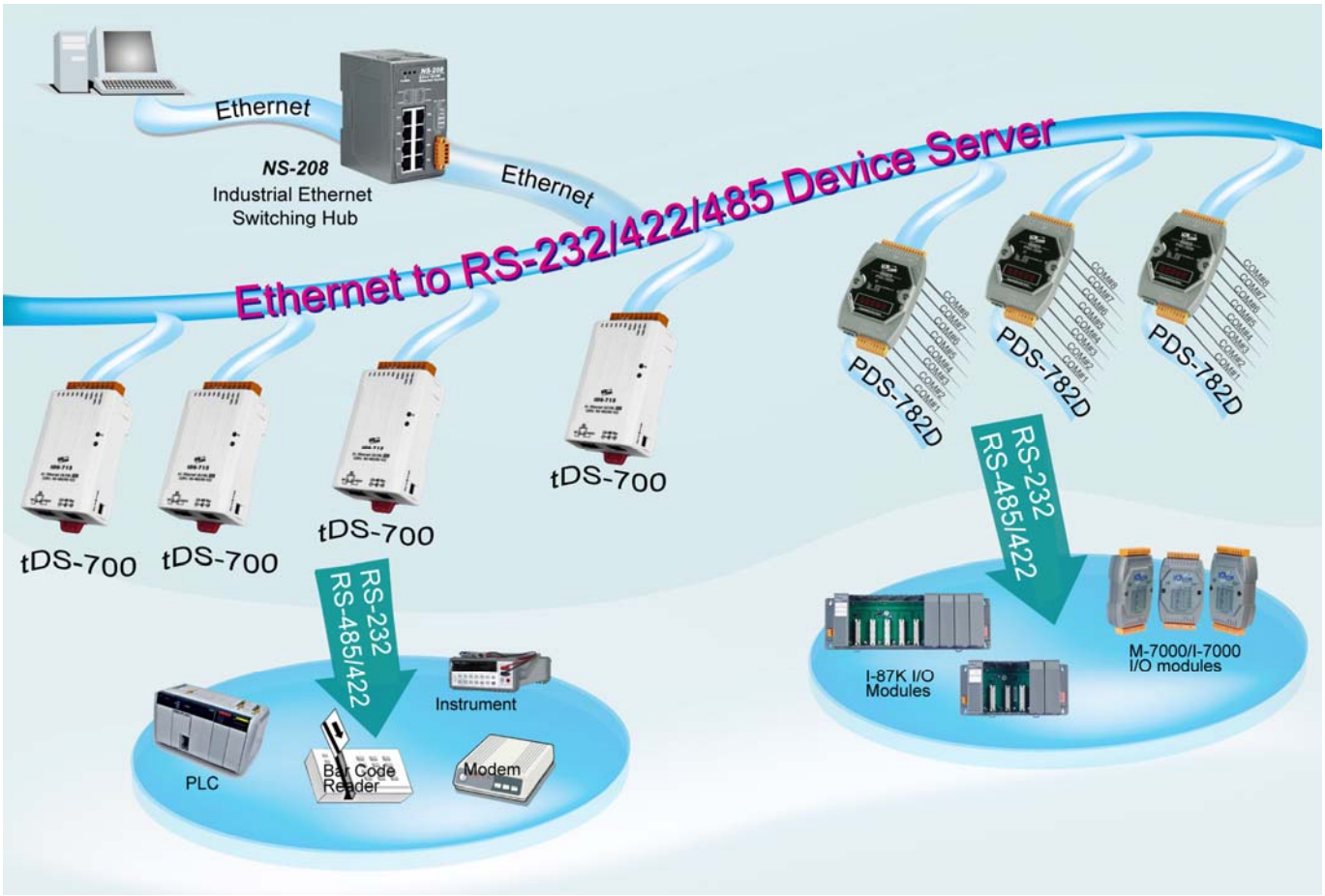


The tDS-700 device servers can be used to create a pair-connection application (as well as serial-bridge or serial-tunnel), and then route data over TCP/IP between two serial devices. It's useful when connecting mainframe computers, servers or other serial devices that do not themselves have Ethernet capability. By virtue of its protocol independence and flexibility, the tDS-700 meets the demands of virtually any network-enabled application.

For maximum space savings, the tDS-700 is offered in an amazing tiny form-factor that makes it can be easily installed in anywhere, even directly attached to a serial device or embedded into a machine. The tDS-700 features a powerful 32-bit MCU to handle efficient network trafficking. The tDS-700 offers true IEEE 802.3af-compliant (classification, Class 1) Power over Ethernet (PoE) using a standard category 5 Ethernet cable to receive power from a PoE switch like the NS-205PSE. When there is no PoE switch on site, the tDS-700 accepts power input from DC adapter.

1.1 Why Ethernet Solutions?

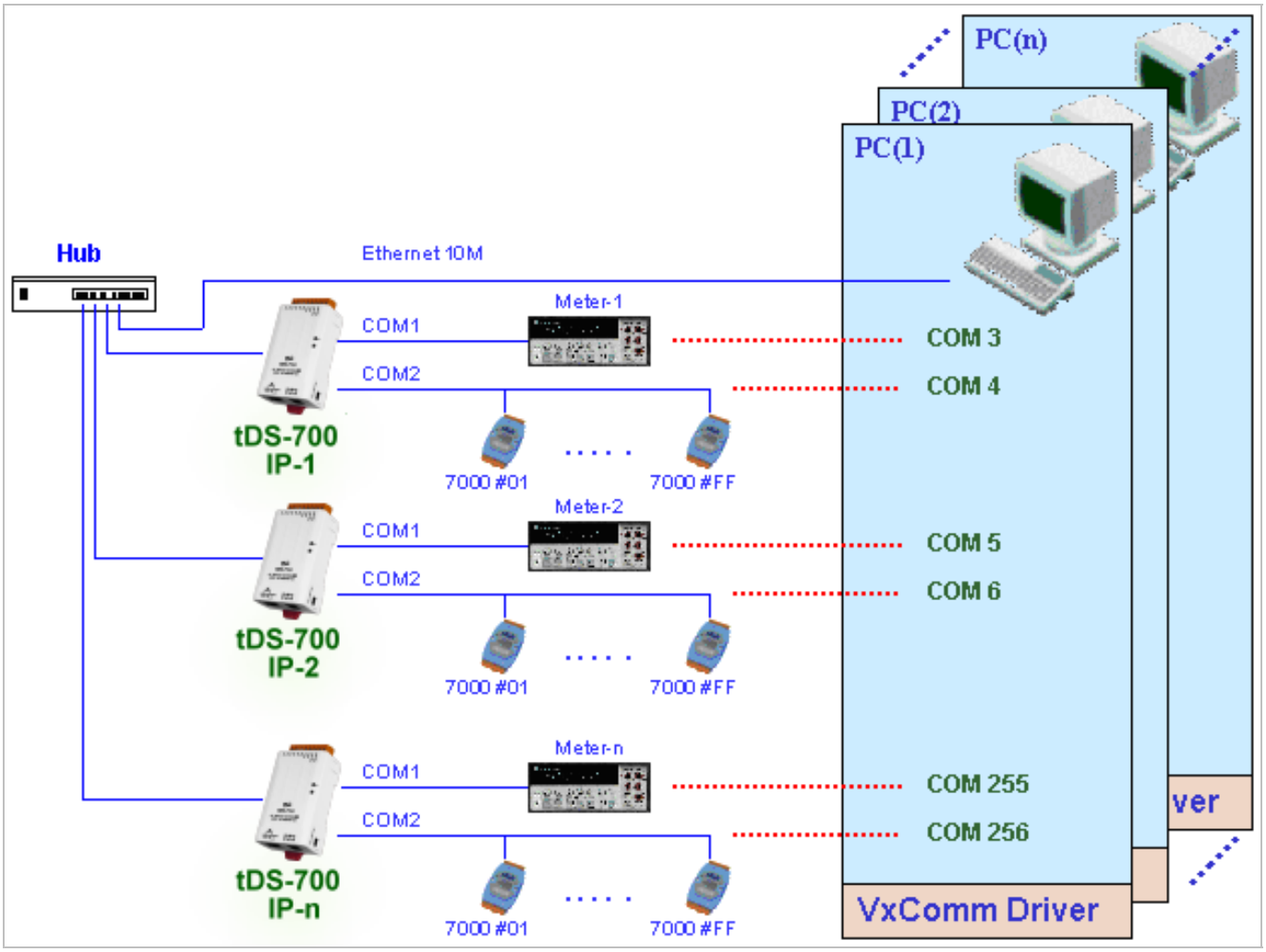
Nowadays, the Ethernet protocol has become the de-facto standard for local area networks. Via the Internet, connectivity is occurring everywhere, from home appliances, to vending machines, to testing equipment, to UPS ...etc. An Ethernet network can link office automation and industrial control networks, access remote systems and share data and information between multivendor machines; it also provides a cost-effective solution for industrial control networks.



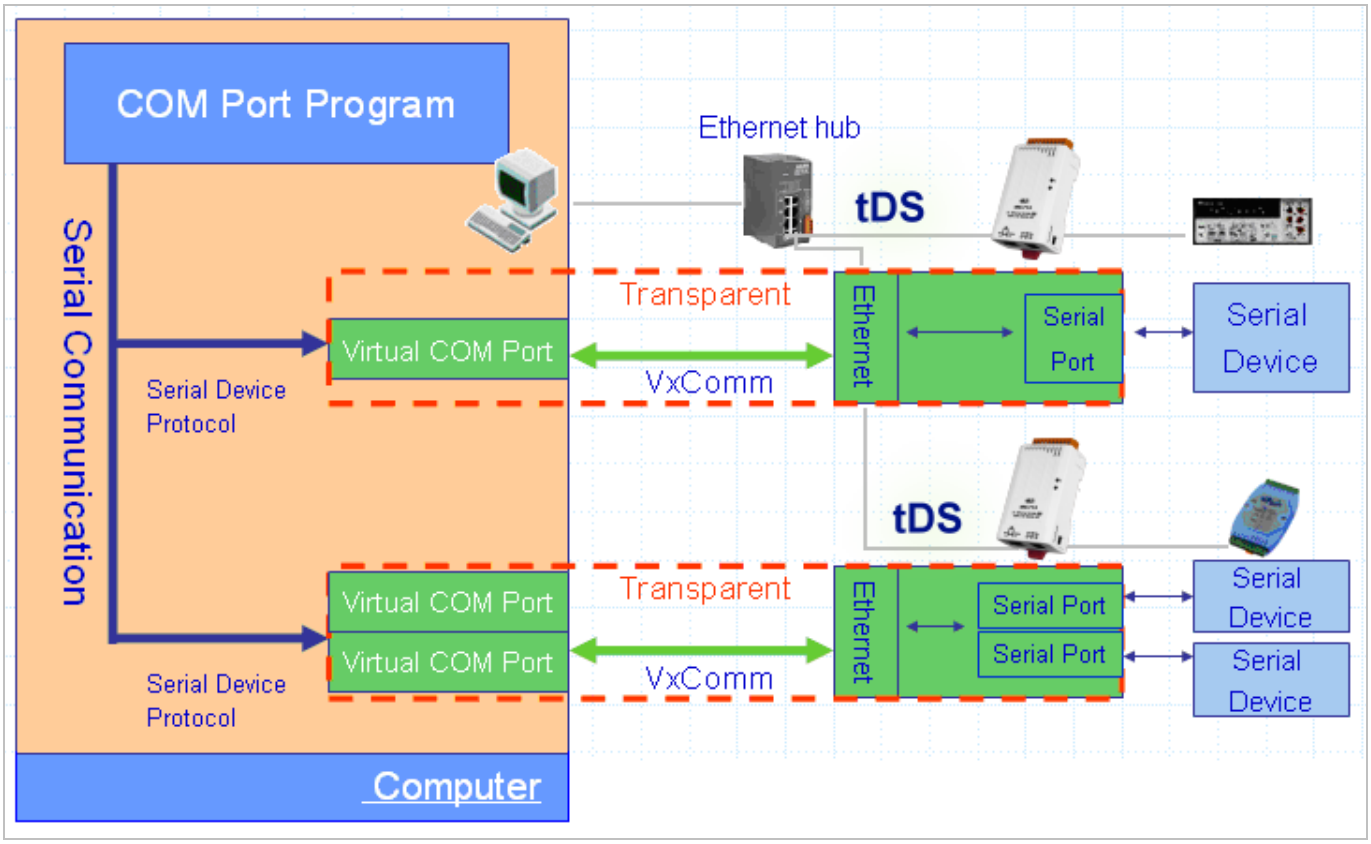
1.2 Why VxComm Technology?

In general, writing a TCP/IP program is more difficult than a COM port program, or the COM port communication system was built many years ago.

As a result, a new technology, **VxComm** was developed to **virtualizes the COM ports of the tDS-700 to allow up to 1 ~ 256 COM Ports to be used on the central computer.** The VxComm driver saves time when accessing serial devices through the Ethernet without the need for reprogramming the COM port software on the PC.

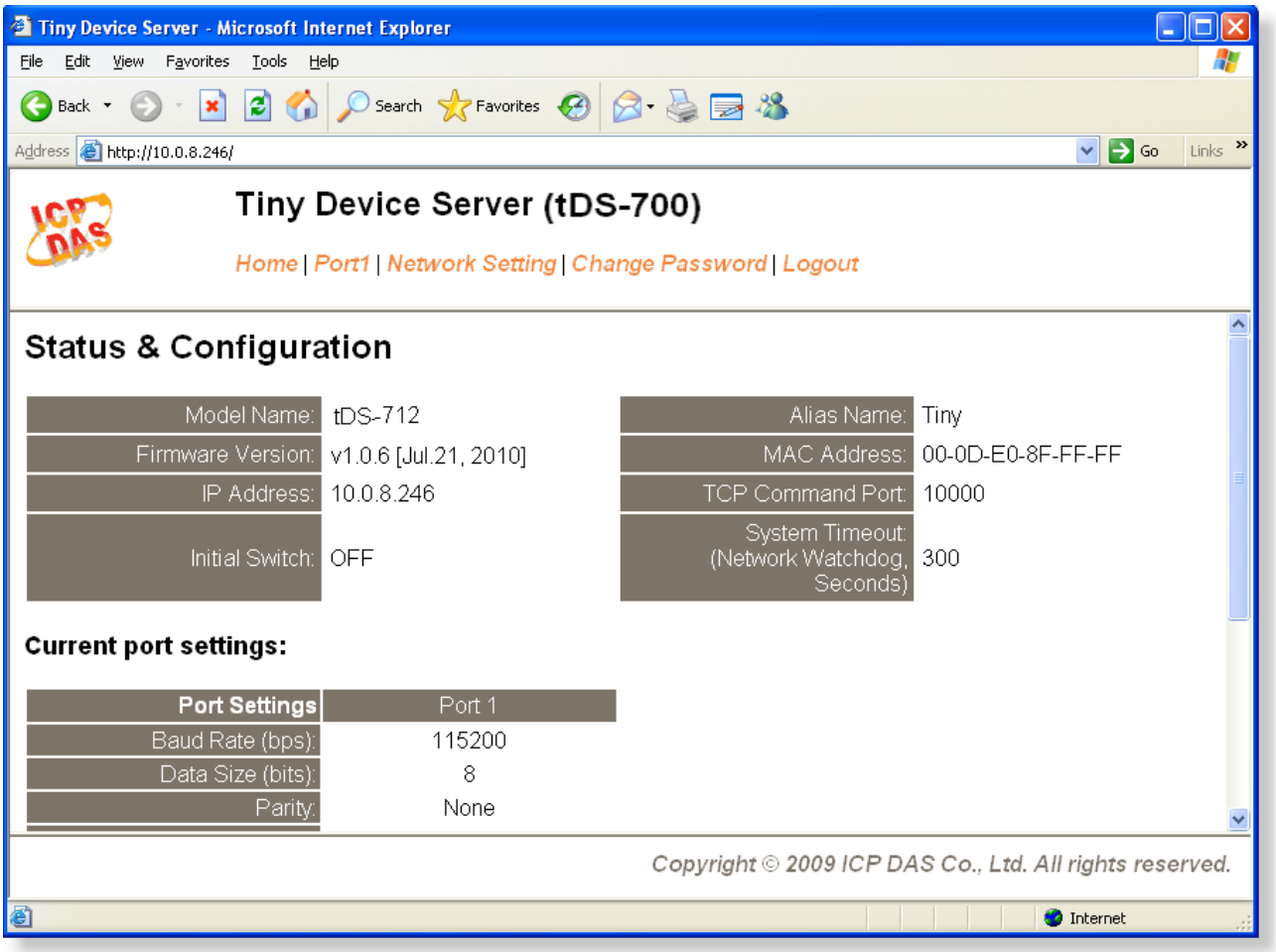


The VxComm driver controls all the details of the Ethernet TCP/IP programming technique; your COM port program will be able to access your serial devices through Ethernet in the same way as through COM port with the assistance of tDS-700 and VxComm technology.



1.3 Why Web Server Technology?

Web server technology enables configuration of the tDS-700 via a standard web browser interface, e.g. Internet Explorer, FireFox or Mozilla, etc. This means that it is easy to check the configuration of the tDS-700 via an Ethernet network without needing to install any other software tools; thereby reducing the user's learning carve.


Tiny Device Server - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://10.0.8.246/
Go Links
Tiny Device Server (tDS-700)
Home | Port1 | Network Setting | Change Password | Logout
Status & Configuration
Model Name: tDS-712
Alias Name: Tiny
Firmware Version: v1.0.6 [Jul.21, 2010]
MAC Address: 00-0D-E0-8F-FF-FF
IP Address: 10.0.8.246
TCP Command Port: 10000
Initial Switch: OFF
System Timeout (Network Watchdog, Seconds): 300
Current port settings:
Port Settings | Port 1
Baud Rate (bps): 115200
Data Size (bits): 8
Parity: None
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Internet

2. Hardware Information

2.1 Specifications

Model	tDS-712	tDS-722	tDS-732	tDS-715	tDS-725	tDS-735	tDS-718
System							
CPU	32-bit MCU						
Communication Interface							
Ethernet	10/100 Base-TX, 8-pin RJ-45 x 1, (Auto-negotiating, Auto-MDI/MDIX, LED indicator) PoE (IEEE 802.3af, Class 1)						
COM1	5-wire RS-232	5-wire RS-232	3-wire RS-232	2-wire RS-485 4-wire RS-422	2-wire RS-485	2-wire RS-485	3-wire RS-232 2-wire RS-485 4-wire RS-422
COM2	-	5-wire RS-232	3-wire RS-232	-	2-wire RS-485	2-wire RS-485	-
COM3	-	-	3-wire RS-232	-	-	2-wire RS-485	-
Self-Tuner	-			Yes, automatic RS-485 direction control			
UART	16c550 or compatible						
COM Port Format							
Baud Rate	115200 bps Max.						
Data Bit	5, 6, 7, 8						
Parity	None, Odd, Even, Mark, Space						
Stop Bit	1, 2						
General							
Power Input	PoE: IEEE 802.3af, Class 1 DC jack: +12 ~ 48 V_{DC}						
Power Consumption	0.05 A @ 24 V_{DC}						
Connector	Male DB-9 x1	10-Pin Removable Terminal Block x 1					
Mounting	DIN-Rail						
Flammability	Fire Retardant Materials (UL94-V0 Level)						
Operating Temperature	-25° ~ 75°C						
Storage Temperature	-30° ~ 80°C						
Humidity	10 ~ 90% RH, non-condensing						

2.2 Features

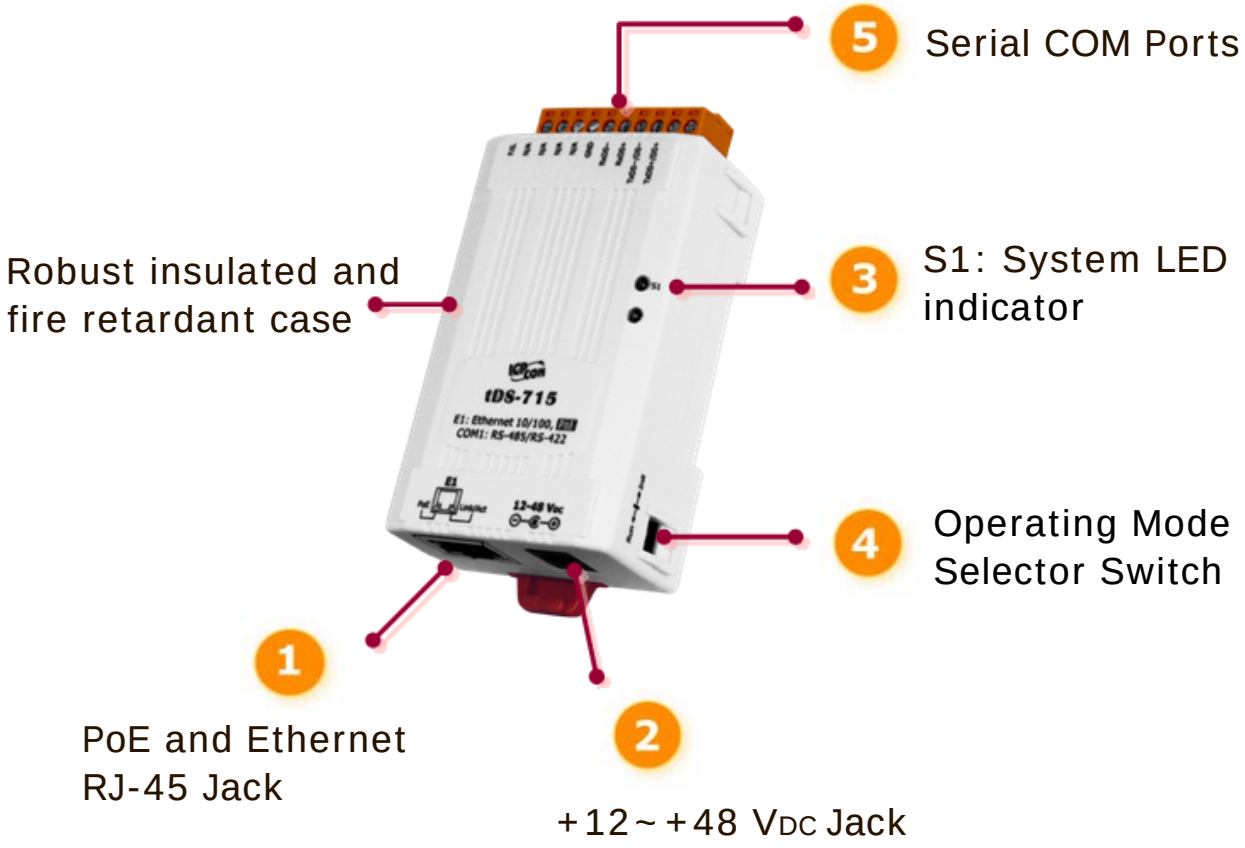
- Incorporates any RS-232/422/485 serial device in Ethernet
- Supports pair-connection (serial-bridge, serial-tunnel) application
- Powerful 32-bit MCU handles efficient network trafficking
- 10/100 Base-TX Ethernet, RJ-45 x1
  (Auto-negotiating, auto MDI/MDIX, LED Indicators)
- Redundant power inputs: PoE (IEEE 802.3af, Class 1) and DC jack
- Automatically RS-485 direction control
- Supports TCP, UDP, HTTP, DHCP, BOOTP and TFTP protocols
- Supports UDP responder for device discovery
- Easy firmware update via Ethernet
- Built-in a tiny Web server for configuration
- Male DB-9 or Terminal block connector for easy wiring
- Tiny form-factor and low power consumption
- RoHS compliant with no Halogen
- Made from fire retardant materials (UL94-V0 Level)
- Cost-effective Device Servers

2.3 Selection Guide

Model	CPU	Ethernet	Baud Rate	COM1	COM2	COM3
tDS-712	32-bit MCU	10/100 Base-TX, PoE	115200 bps	5-wire RS-232	-	-
tDS-722				5-wire RS-232	5-wire RS-232	-
tDS-732				3-wire RS-232	3-wire RS-232	3-wire RS-232
tDS-715				2-wire RS-485 4-wire RS-422	-	-
tDS-725				2-wire RS-485	2-wire RS-485	-
tDS-735				2-wire RS-485	2-wire RS-485	2-wire RS-485
tDS-718				3-wire RS-232 2-wire RS-485 4-wire RS-422	-	-

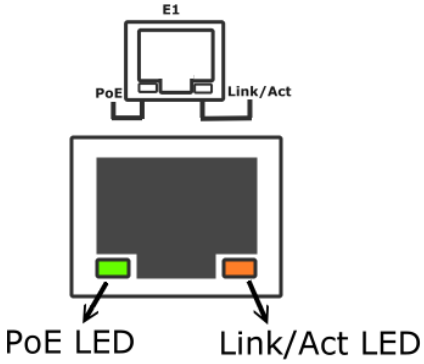
3-Wire RS-232: RxD, TxD, GND (Non-isolated)
5-Wire RS-232: RxD, TxD, CTS, RTS, GND (No-isolated)
2-Wire RS-485: DATA+, DATA-, GND (Non-isolated)
4-Wire RS-422: TxD+, TxD-, RxD+, RxD-, GND (Non-islated)

2.4 tDS-700 Front View



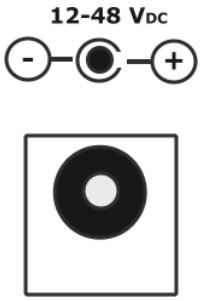
1. PoE and Ethernet RJ-45 Jack:

The tDS-700 is equipped with a RJ-45 jack for the 10/100 Base-TX Ethernet port and features networking capability. When the Ethernet link is detected and Ethernet packet is received, the **Link/Act LED (Orange)** indicator will be on. When power is supplied via PoE (Power-over-Ethernet), the **PoE LED (Green)** indicator will be on.



2. +12~+48 VDC Jack:

The tDS-700 is equipped with a +12~+48 VDC jack for the power supply. When there is no PoE switch on site, the tDS-700 accepts power input from DC adapter.



3. S1: System LED indicator:

The tDS-700 power supply after the system LED indicator is as follows:

Function	System LED Action
Running Firmware	ON
Network ready	Flashing per 3 seconds
Serial Port Busy	Flashing per 0.2 seconds

4. Operating Mode Selector Switch:

Init Mode: Configuration mode
Run Mode: Firmware running mode

In the tDS-700 series, the Switch is always in the Run position. When updating the tDS-700 firmware, the switch needs to be moved from the Run position to the Init position. Move the Switch to the Run position after the update is complete.

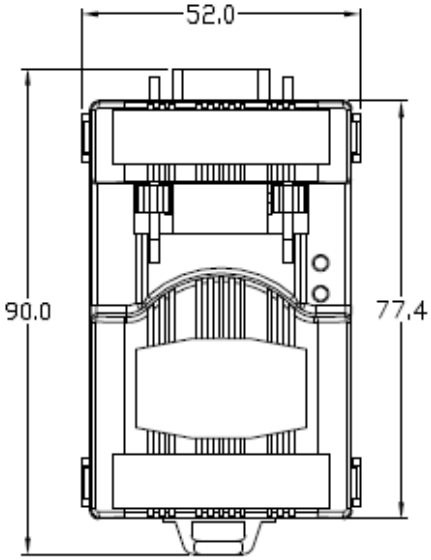
5. Serial COM Ports:

Depending on the types of the tDS-700 modules.
For more detailed information regarding the pin assignments of the Serial COM ports, please refer to section “2.6 Pin Assignments”.

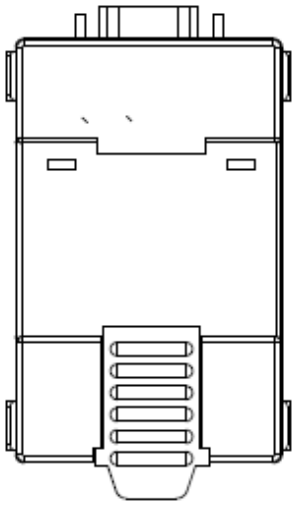
2.5 Dimensions

- tDS-712 dimensions:

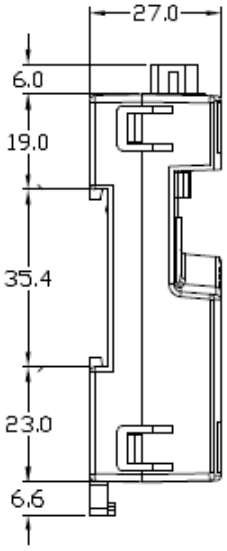
Unit: mm



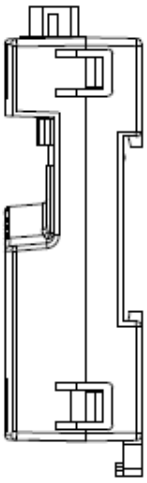
Front View



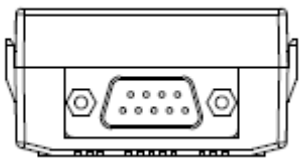
Back View



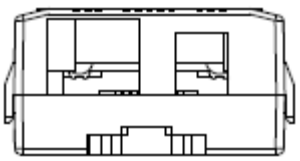
Left Side View



Right Side View



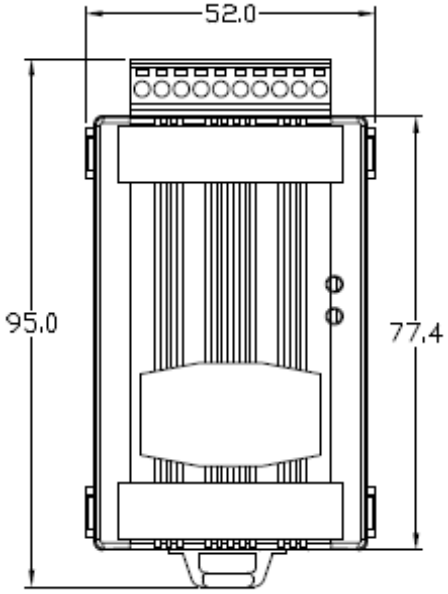
Top View



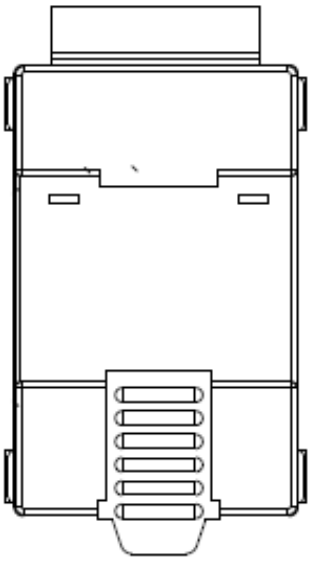
Bottom View

- tDS-722, tDS-732, tDS-715, tDS-725, tDS-735 and tDS-718 dimensions:

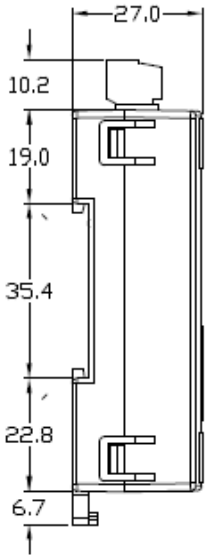
Unit: mm



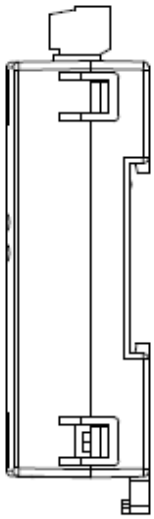
Front View



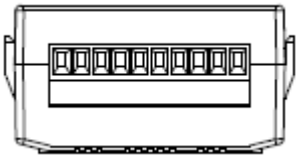
Back View



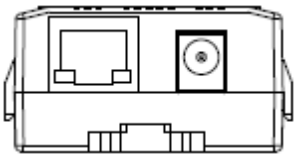
Left Side View



Right Side View



Top View

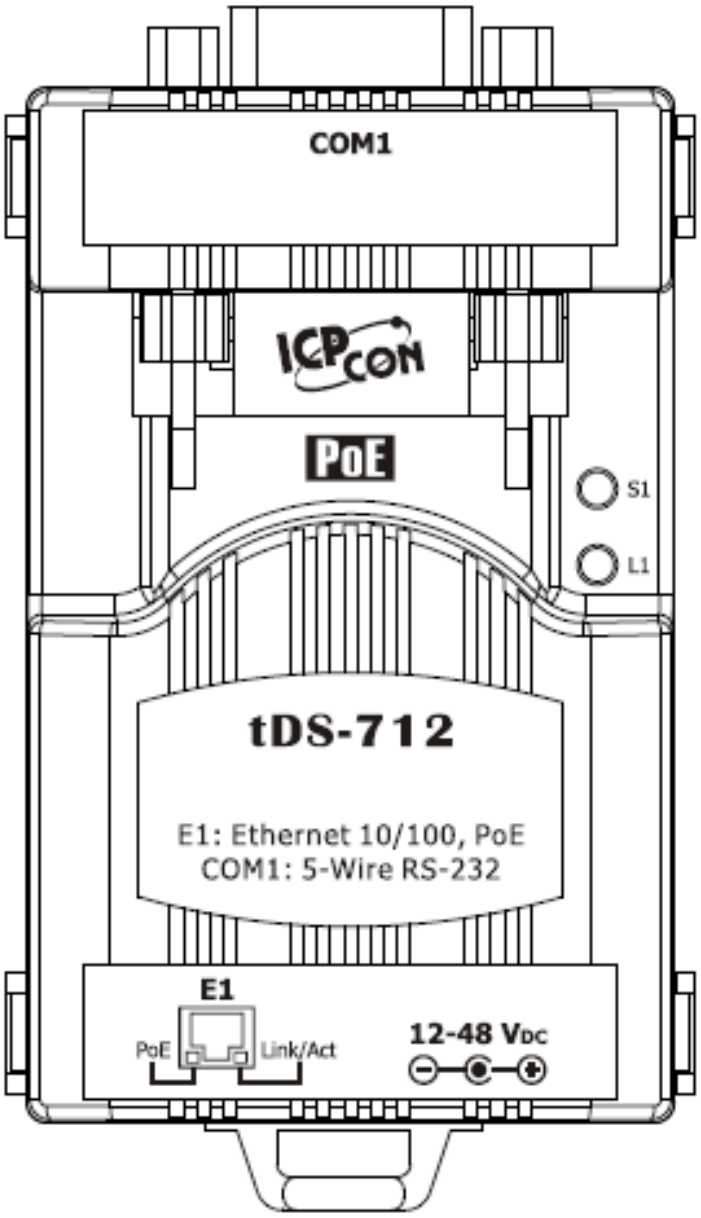


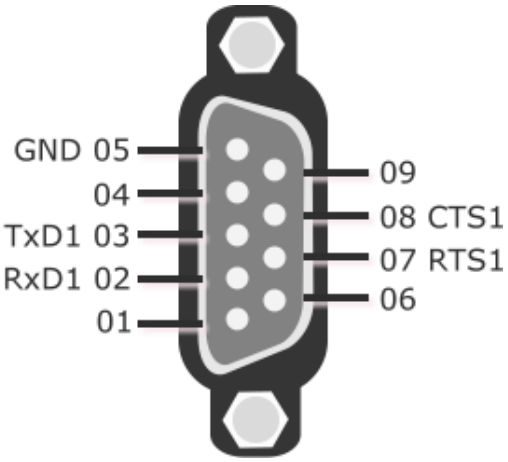
Bottom View

2.6 Pin Assignments

2.6.1 tDS-712 Pin Assignments

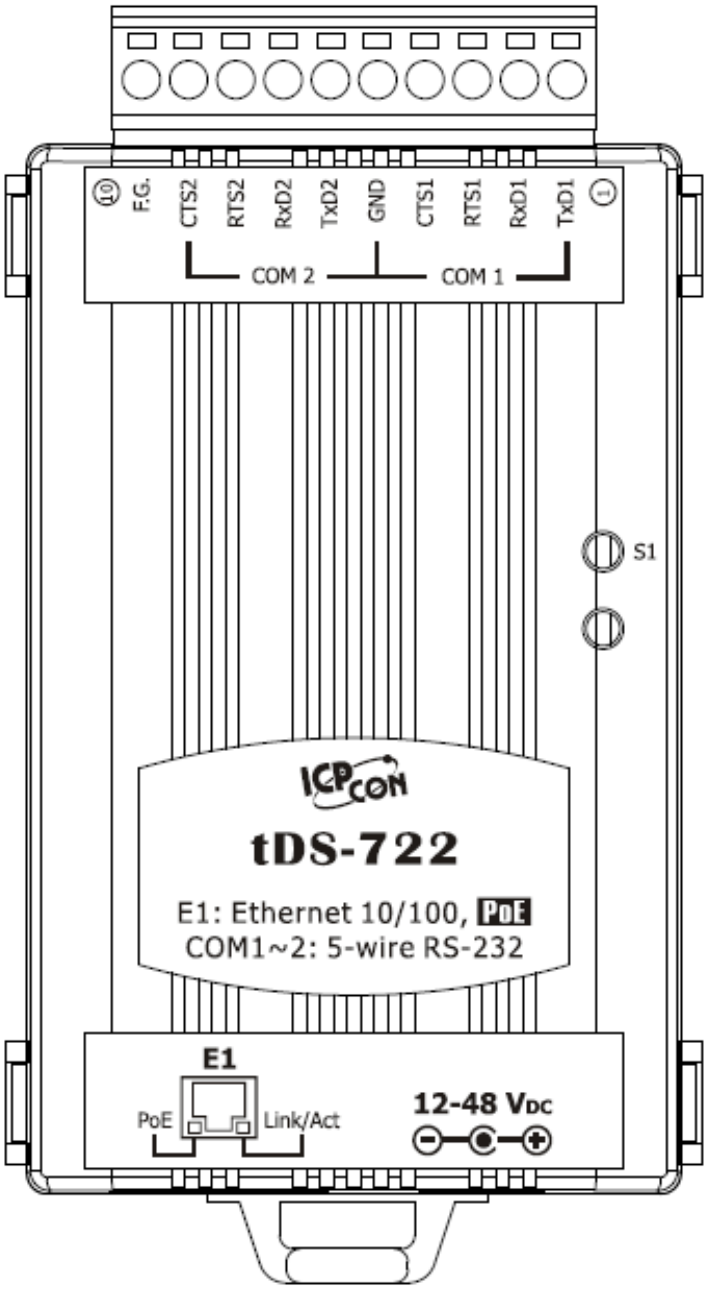
1-Port 5-wire RS-232 Module

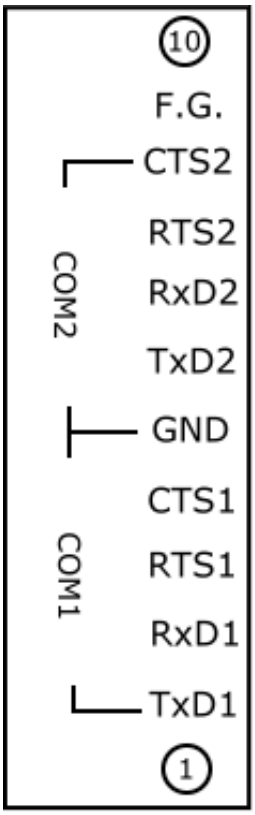




2.6.2 tDS-722 Pin Assignments

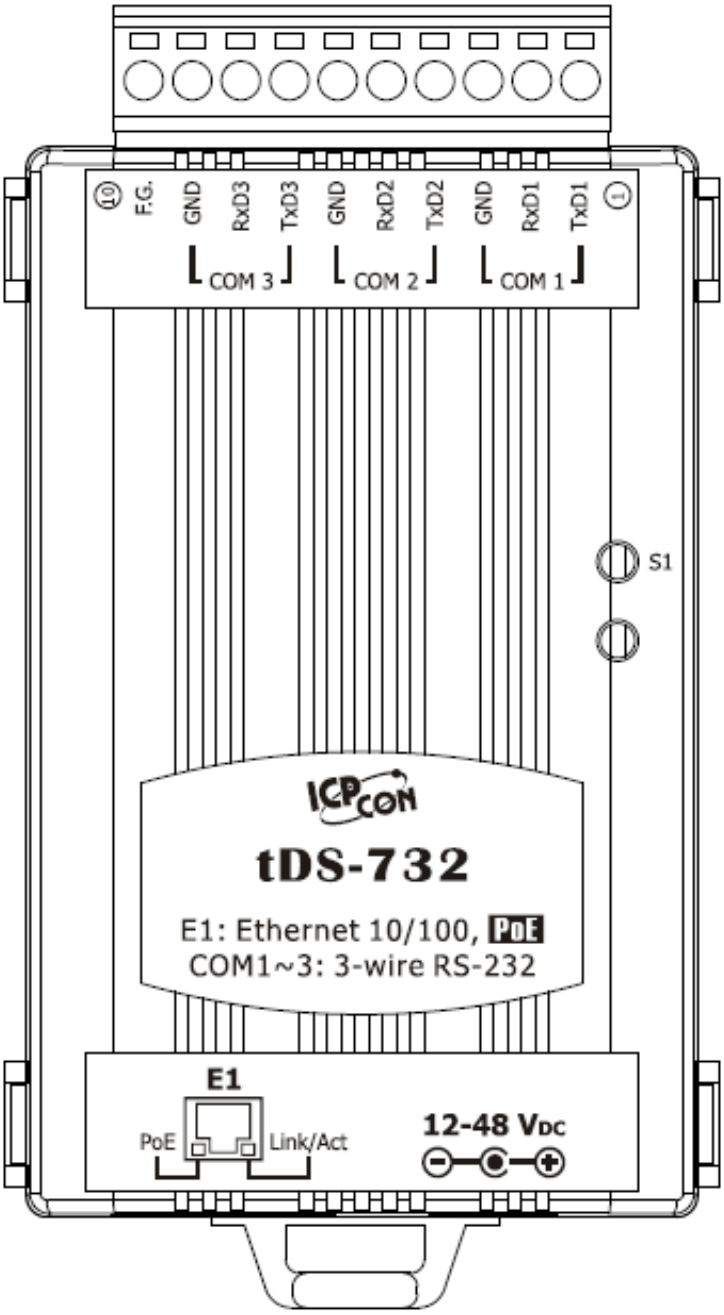
2-Port 5-Wire RS-232 Module

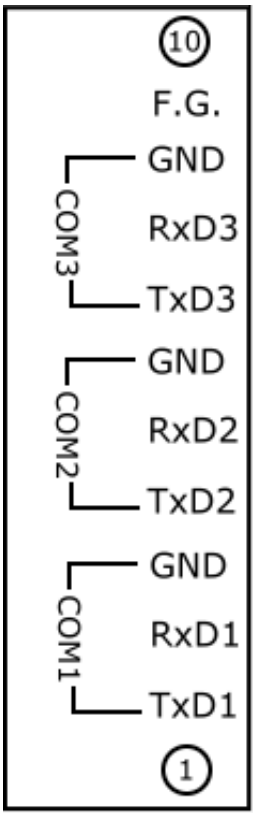




2.6.3 tDS-732 Pin Assignments

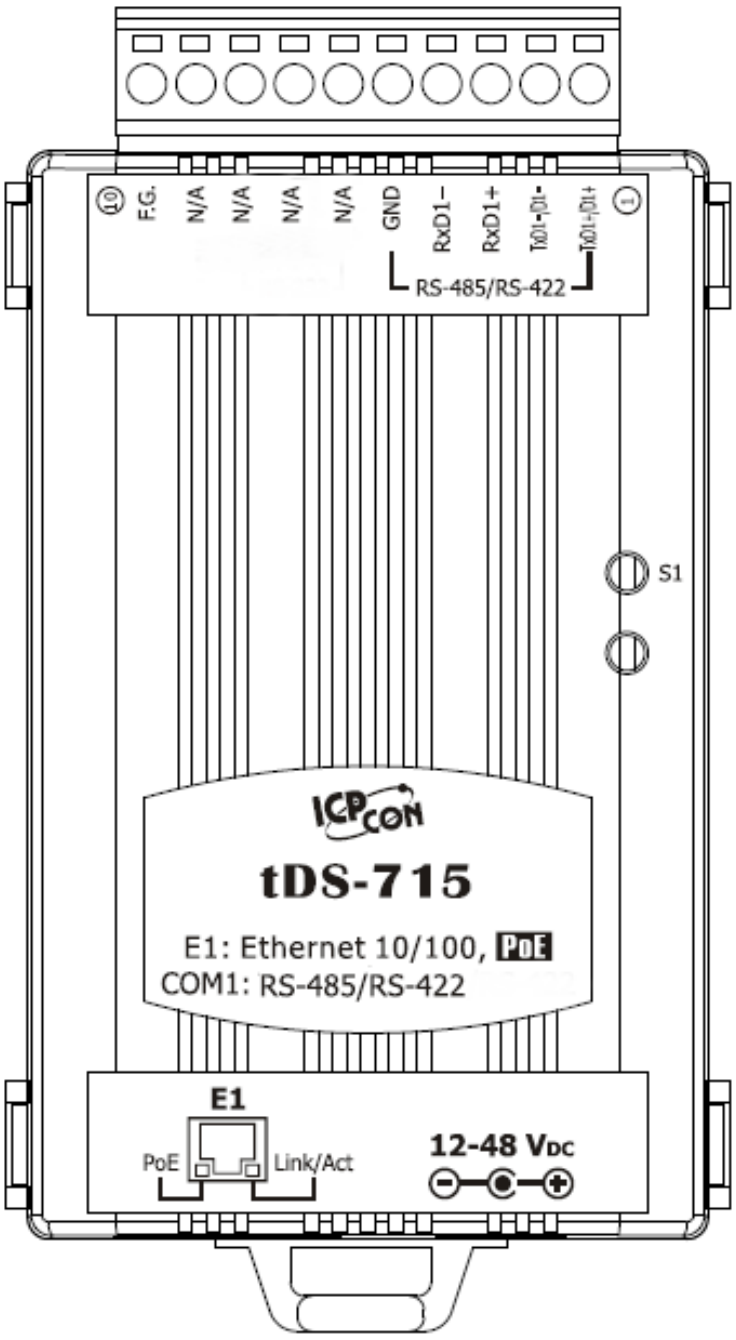
3-Port 3-Wire RS-232 Module

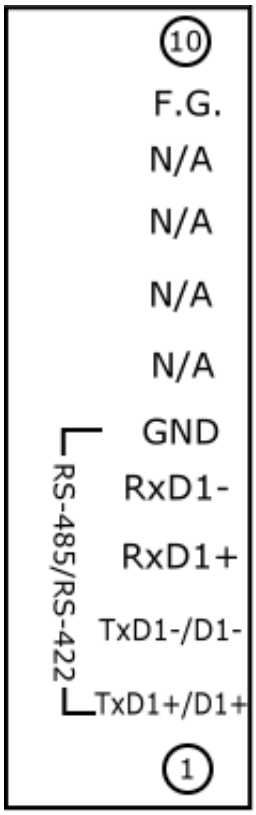




2.6.4 tDS-715 Pin Assignments

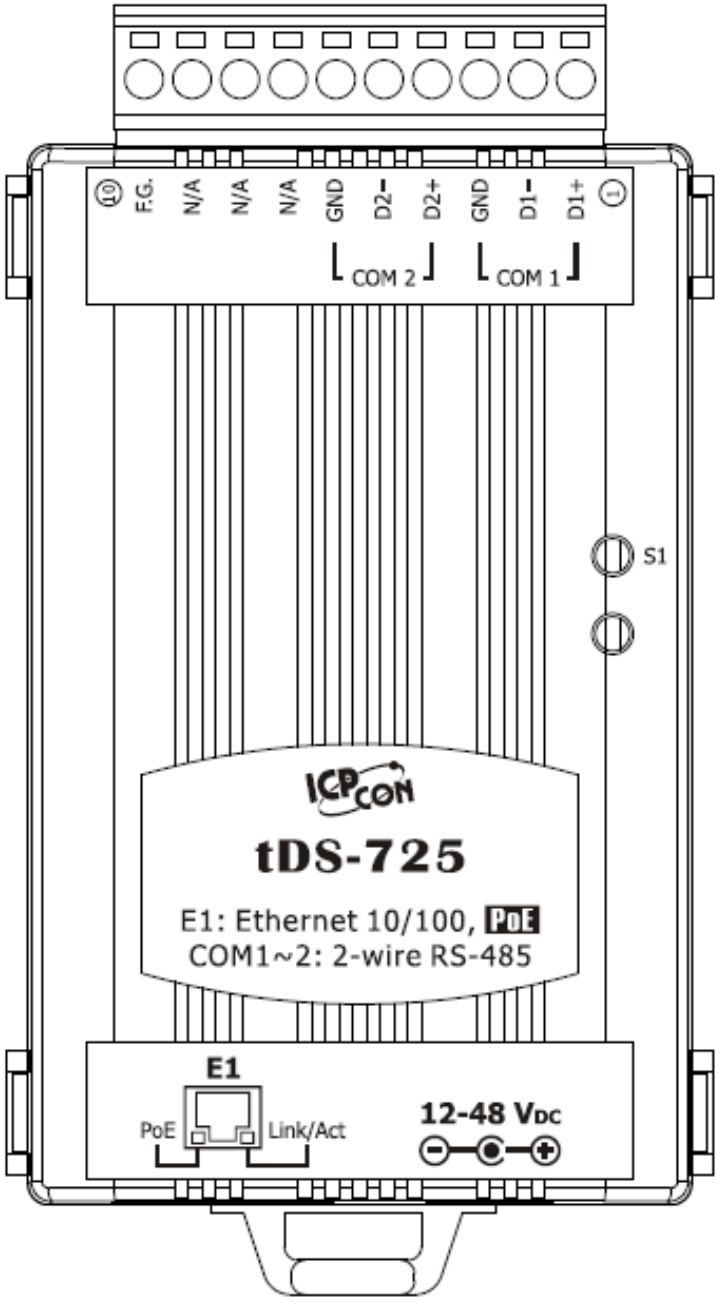
1-Port 2-Wire RS-485/ 4-Wire RS-422 Module

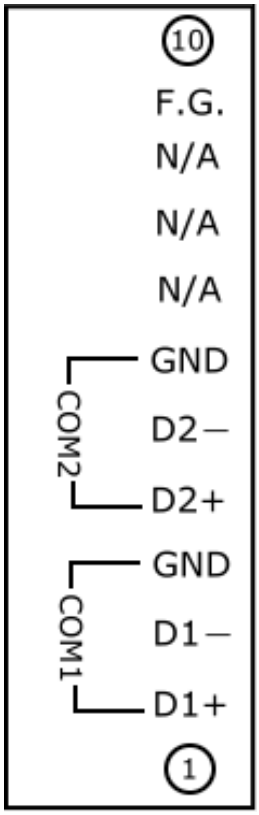




2.6.5 tDS-725 Pin Assignments

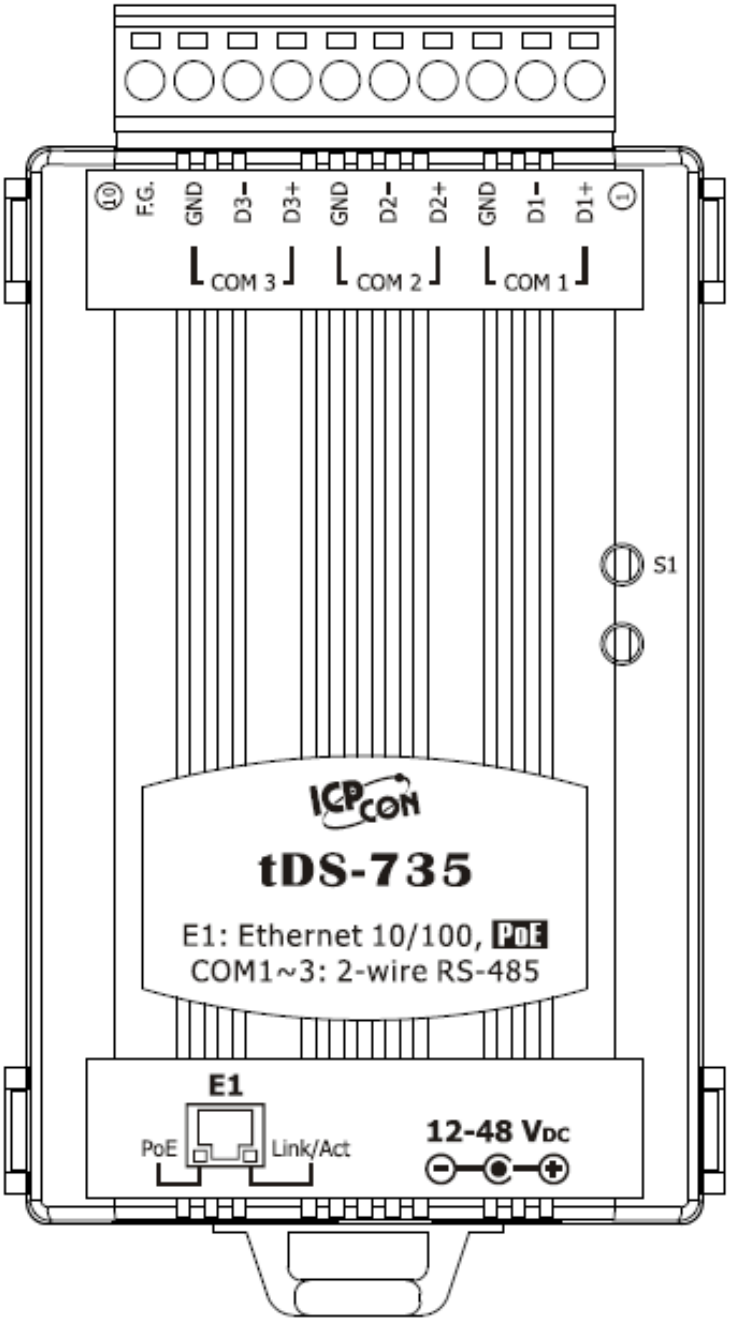
2-Port 2-Wire RS-485 Module

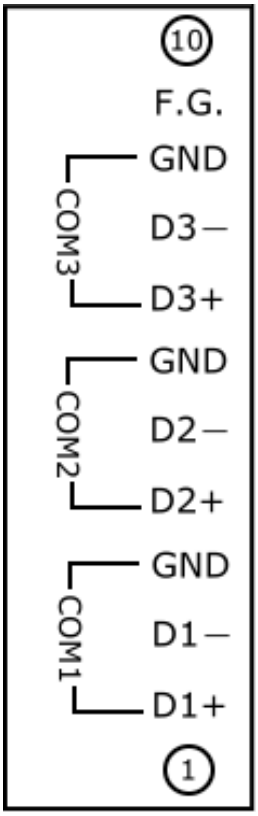




2.6.6 tDS-735 Pin Assignments

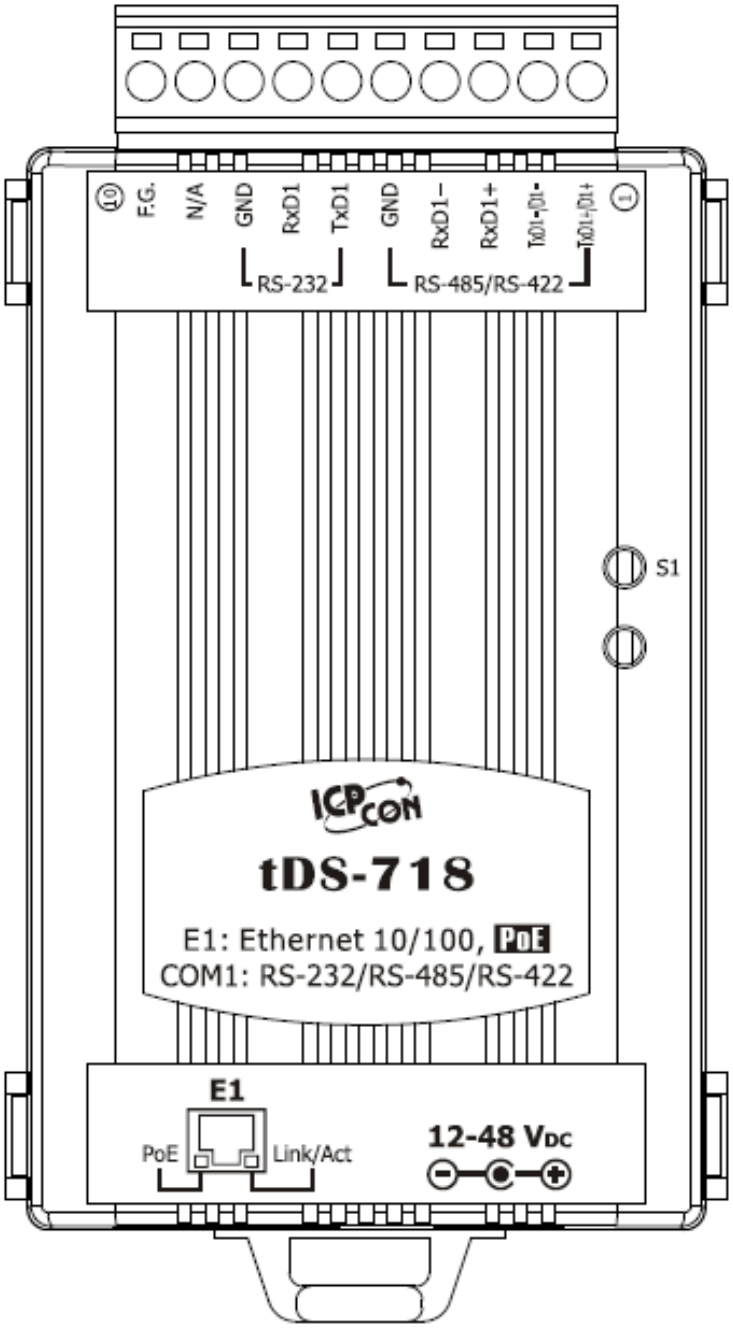
3-Port 2-Wire RS-485 Module

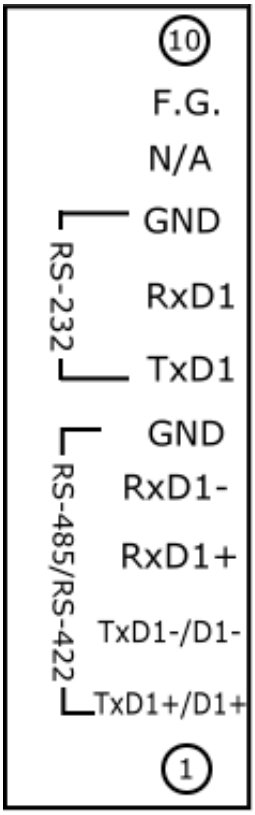




2.6.7 tDS-718 Pin Assignments

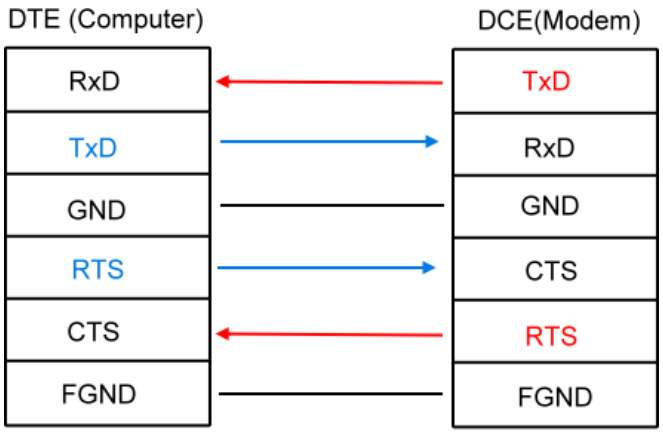
1-Port 3-Wire R232 and 2-Wire RS-485/4-Wire RS-422 Module



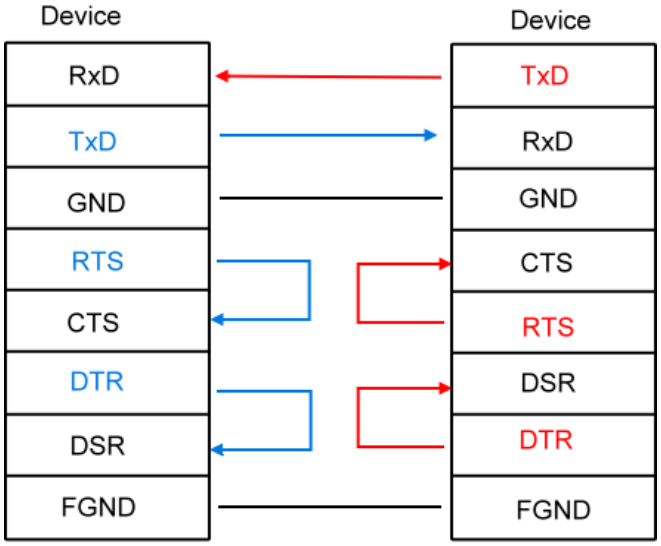


2.7 Wiring Note

2.7.1 RS-232 Wire Connections



5-wire RS-232 connection (DB-9)

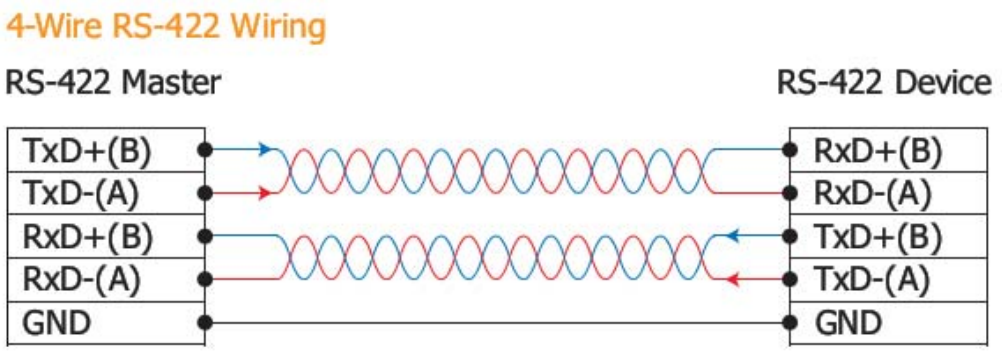


3-wire RS-232 connection
(Shorts unused signals RTS/CTS, DTR/DST)

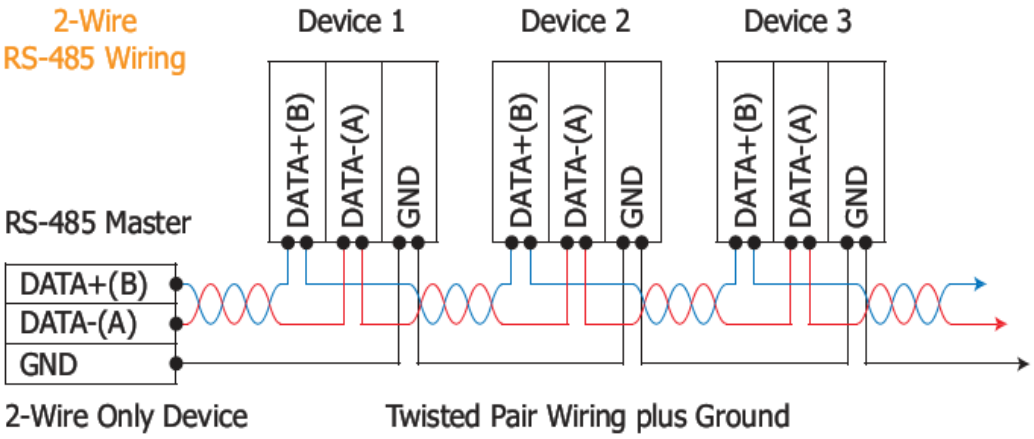
Note!!

1. **For 3-Wire RS-232 connections, it is recommended to short unused signals such as RTS/CTS and DTR/DSR, since some system may still check the CTS and DSR status.**
2. **FGND is the frame ground that soldered to DB9 metal-shield.**

2.7.2 RS-422 Wire Connections



2.7.3 RS-485 Wire Connections



Note!!

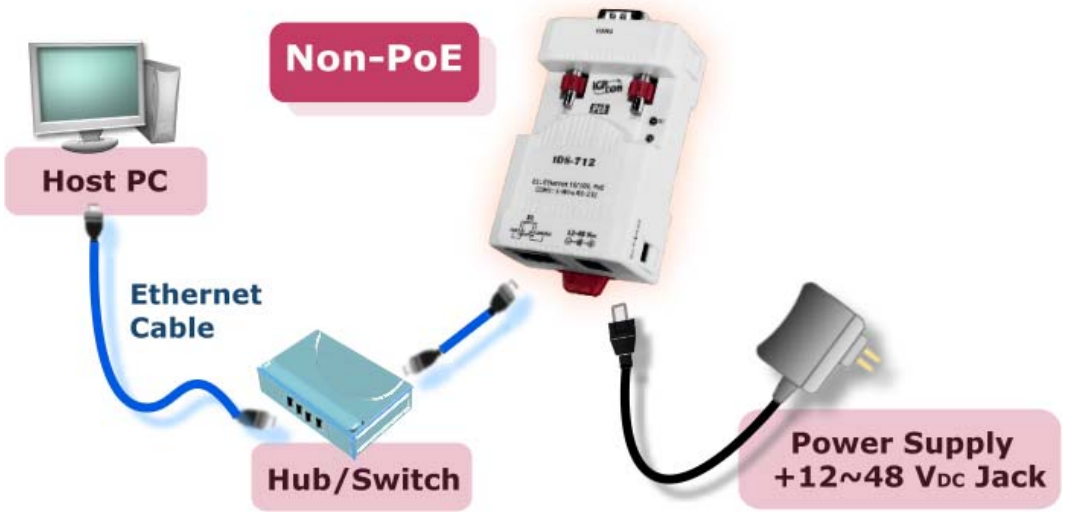
For non-isolated RS-422/485 ports, you should connect all signal grounds of RS-422/485 devices together. This reduces common-mode voltage between devices.

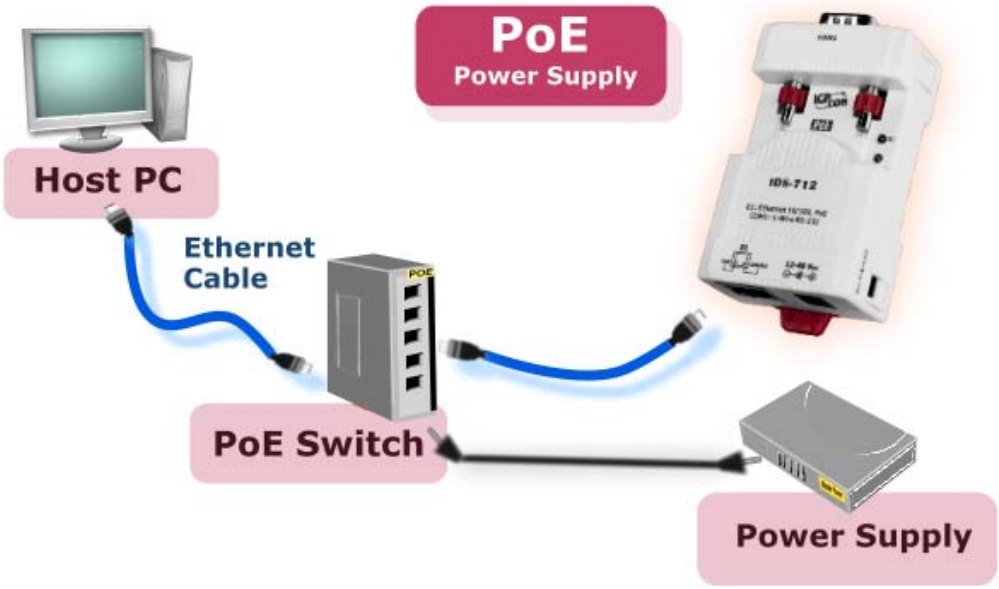
3. Setting up the tDS-700 module

Step 1: Connecting the power and Host PC

1. Make sure your PC has workable network settings.
2. Disable or correctly configure the Windows firewall and any Anti-Virus software firewall first or else the "**Search Servers**" function in the VxComm Utility may not work. (Contact your System Administrator for more details of how to do this.)
3. Check Init/Run switch is on **Run** position.

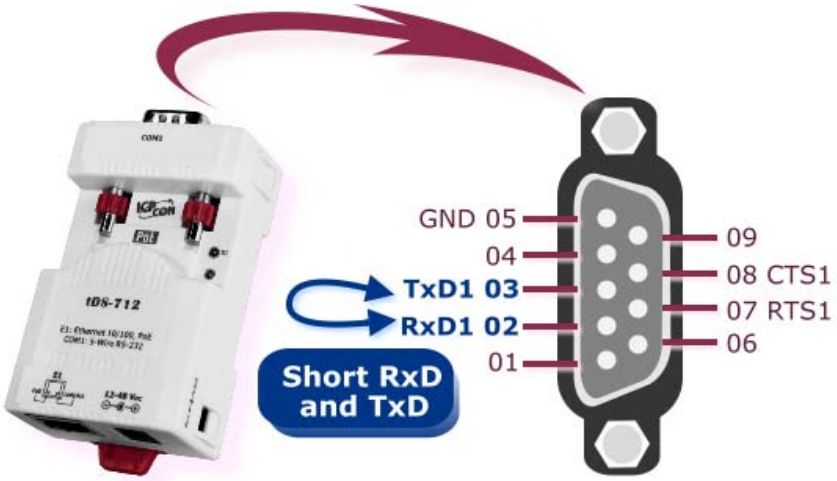
4. Connect both the tDS-700 and your computer to the same sub network or the same Ethernet Switch and power the tDS-700 on.
5. Make sure the System LED indicator is flashing.



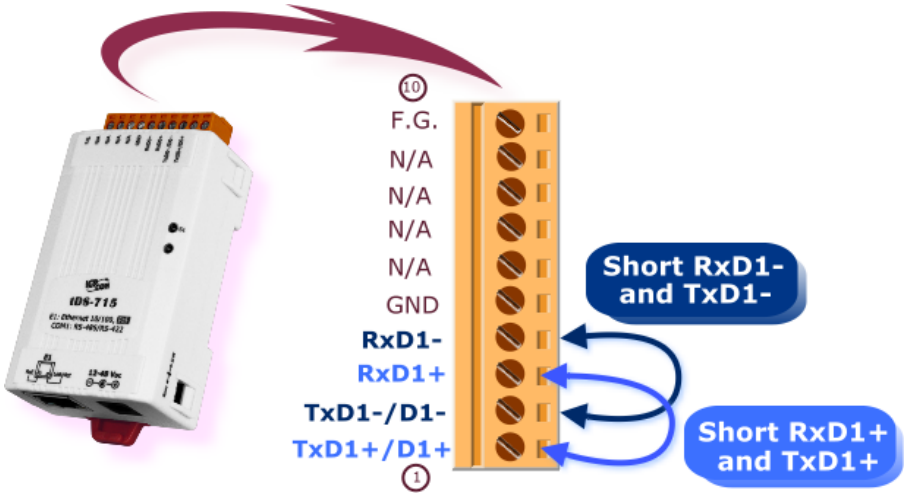


6. Self test wiring as follows:

- RS-232 Wiring of the COM1



- RS-422 Wiring of the COM1:

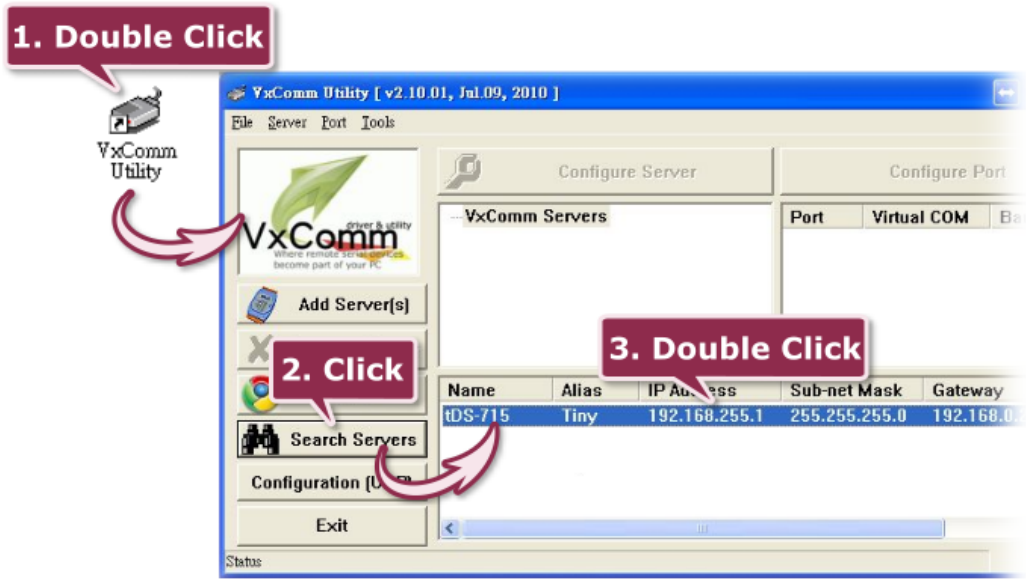


Step 2: Installing VxComm Utility on your PC

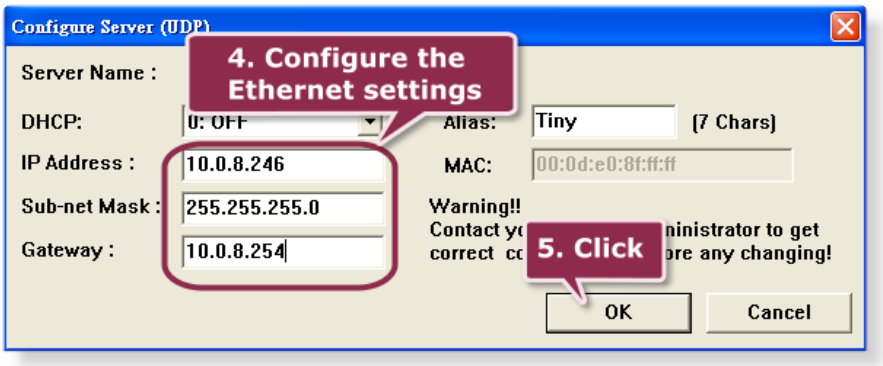
The software is located at:
CD: \NAPDOS\Software\VxComm_Driver
http://ftp.icpdas.com/pub/cd/tinymodules/napdos/software/vxcomm_driver/

Step 3: Search the tDS-700 on the Ethernet network

1. Double click the VxComm Utility shortcut on the desktop.
2. Click the "**Search Servers**" button to search your tDS-700.
3. Double click the name of tDS-700 to open the configure server dialog box.

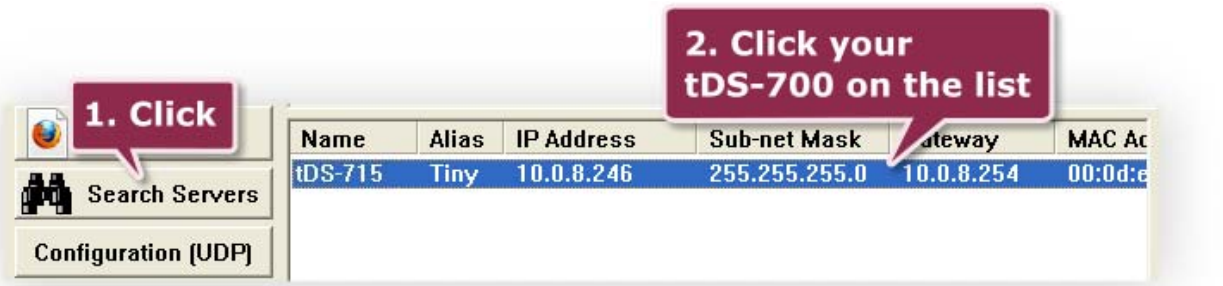


4. Contact your Network Administrator to obtain a correct network configuration (such as **IP/Mask/Gateway**). Enter the network settings and then click "**OK**". The tDS-700 will use the new setting 2 seconds later.

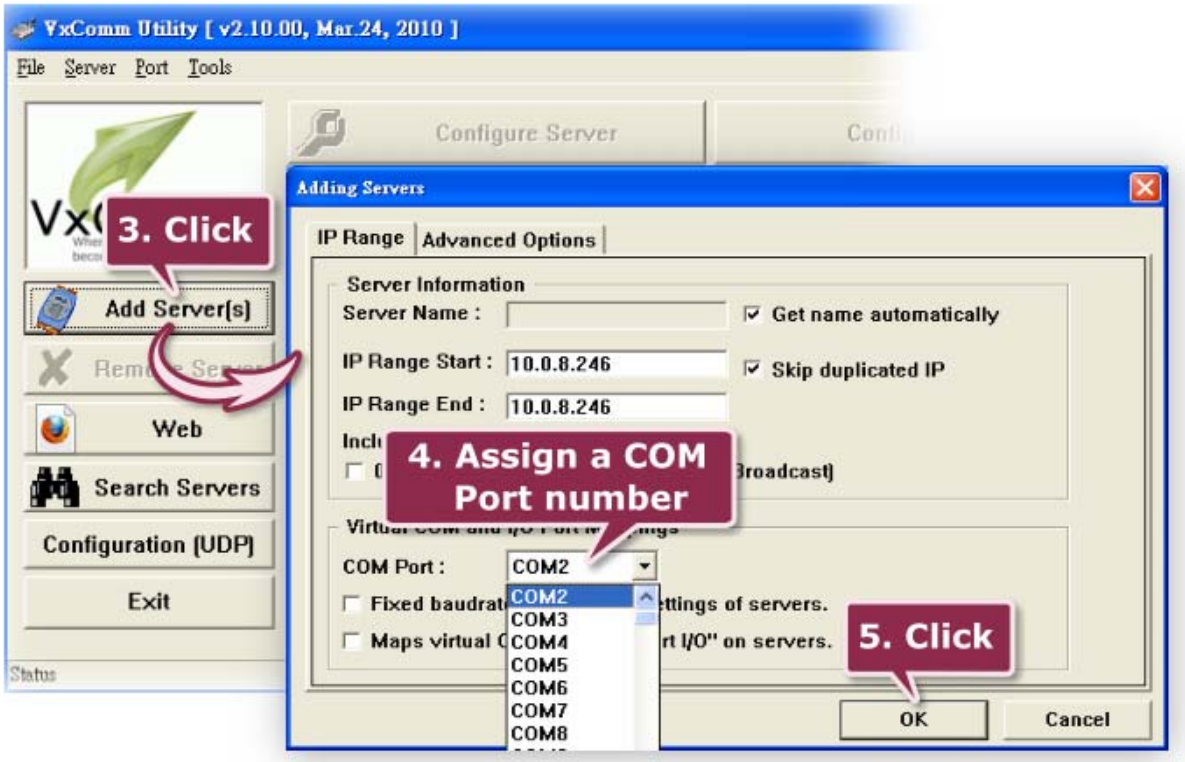


Step 4: Configuring Virtual COM Ports

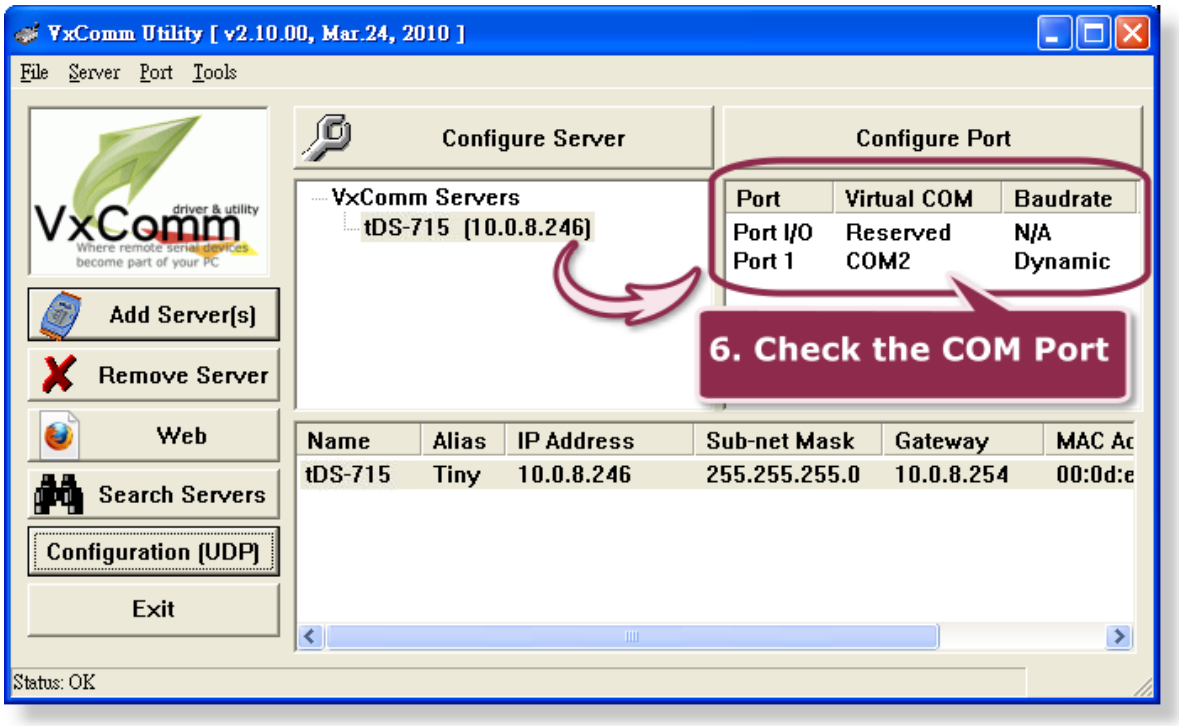
1. Wait 2 seconds and then click the "**Search Servers**" button again to ensure the tDS-700 is working well with new configuration.



2. Click the "**Add Server[s]**" button. Assign a COM Port number and click "**OK**" to save your settings.



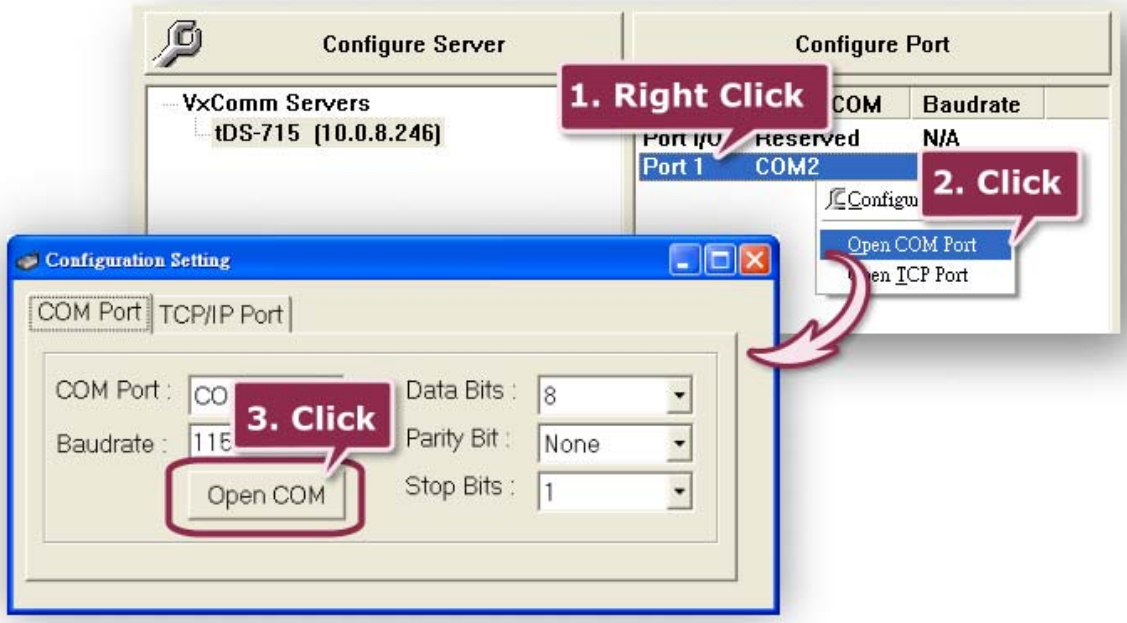
3. Click on tDS-700 name and check the virtual COM port mappings on the PC.



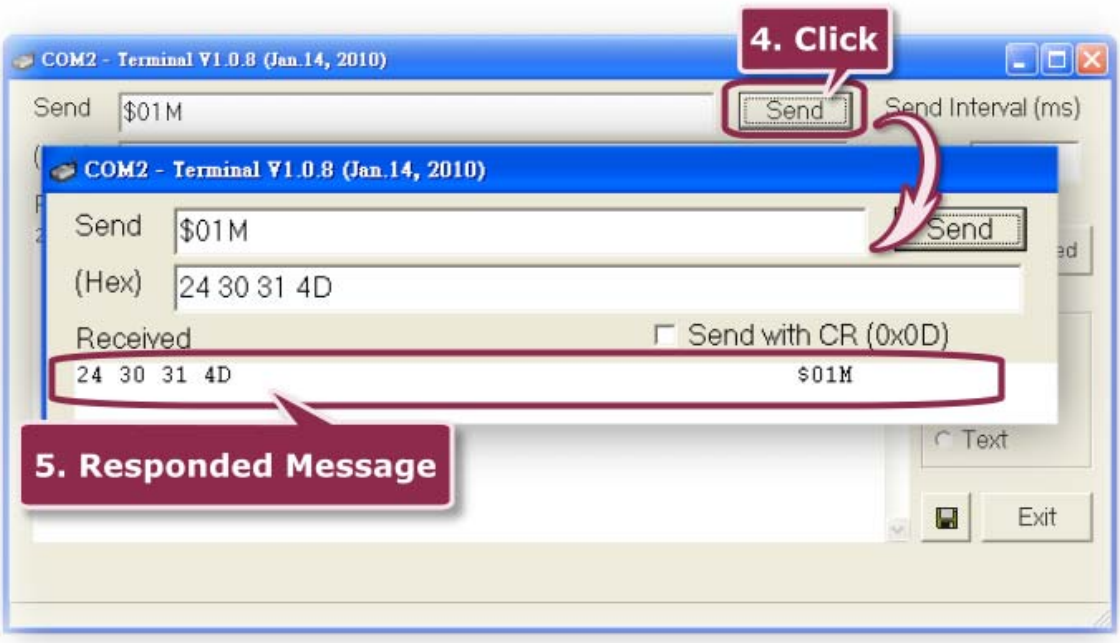
4. Click "**Tools**" >> "**Restart Driver**", and then click the "**Restart Driver**" button.

Step5: Testing your tDS-700

1. Right click Port 1 and then choose the "**Open COM Port**" item.
2. Check that the configuration of the COM Port is correct and then click the "**Open COM**" button.



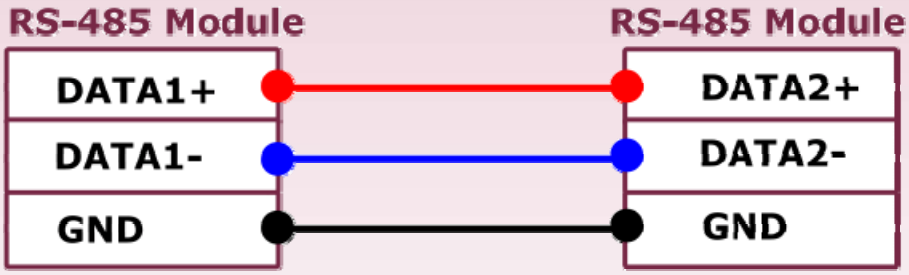
3. Type a string in the send field then click the "**Send**" button. If a response is received, it will be displayed in the received field.



4. If the test is successful, then your COM port program should be able to work with this Virtual COM Port now.

Note!!

While using RS-485 modules (Ex, tDS-725), you should wire the Data1+ with Data2+ signals, and wire the Data1- with Data2- signals for self-test.



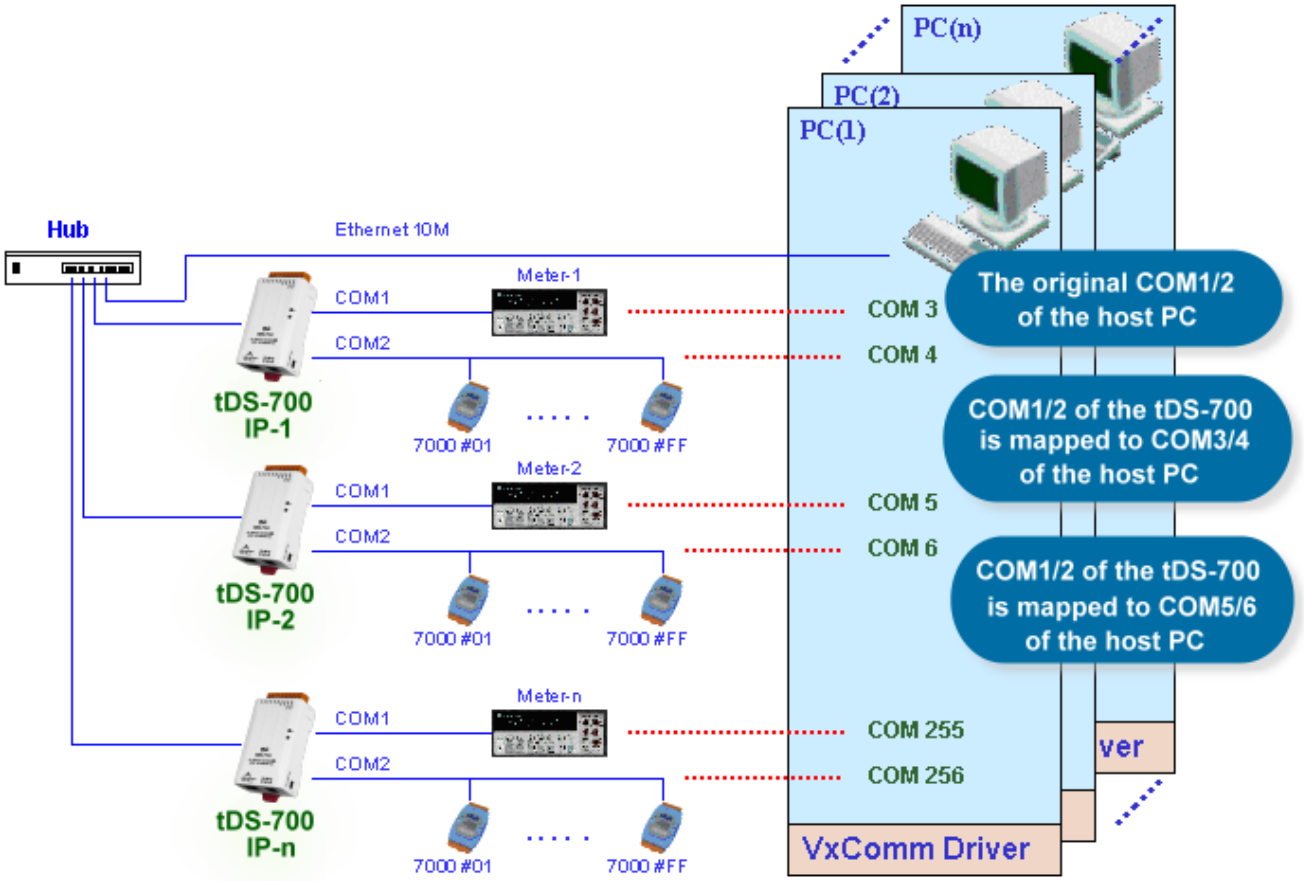
Then open the first two COM ports, send data to one and receive data from the other.

4. Typical Applications for the tDS-700

4.1 RS-232/422/485 Device Networking

--- Using Virtual COM Technology ---

The tDS-700 series is designed to link RS-232/422/485 devices to an Ethernet network. The VxComm utility allows the built-in tDS-700 COM Port to be virtualized to a standard COM Port of the host PC as shown below:



In the configuration above, Meter-1 is virtualized to link to COM3 of the host PC. Therefore a program original designed for the MS-COMM standard can access the meter without any modification.

4.2 Ethernet I/O Applications

The tDS-700 series provides of Ethernet I/O solutions:

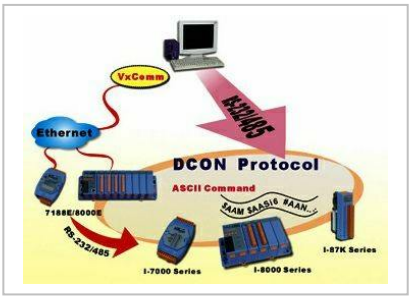
Linking to I-7000 series modules

The I-7000 series provides a variety of I/O operations, such as D/I, D/O, A/D, D/A, Counter and Frequency Measurement, etc. The I-7000 series was originally designed to be used with RS-485 networks, so RS-485 of COM on the tDS-700 can be used to link to I-7000 series modules.

By using VxComm technology, programs that on the host PC support serial devices can be upgraded from a RS-485 network to an Ethernet network without requiring any modifications to the program.

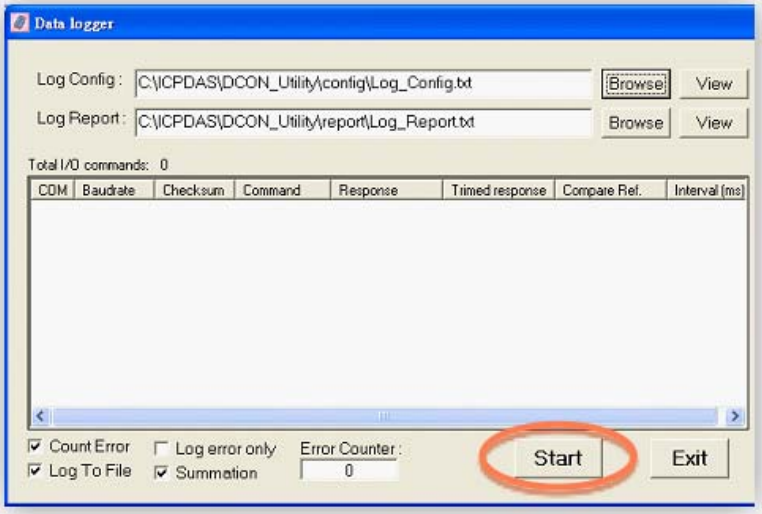
4.3 Configurable Ethernet Data Logger

Using the VxComm driver, tDS-700 + 7000 modules can be virtualized to become COM Port + 7000 modules located on the host-PC, and then the Data Logger in the DCON Utility can be used to access data of I-7000 from the Ethernet. Signal data originating from the I-7000 modules can be analyzed using MS-Excel without the need to write any custom programs

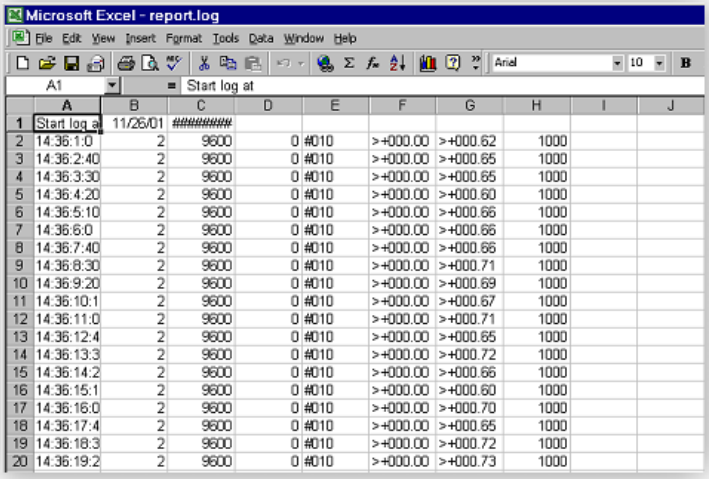


1: The DCON utility includes a log function, as show below:

2: Configure the system connection as shown below and click the **"Start"** button to begin logging data.



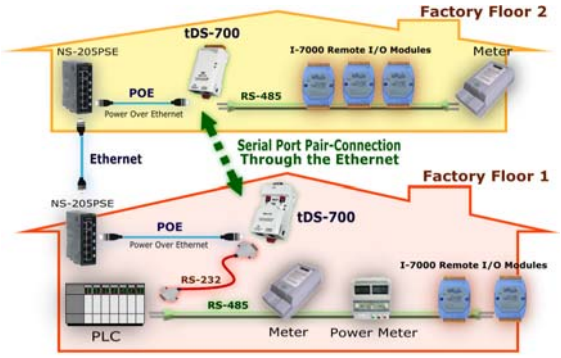
3: Open the log file in Excel to read the log data as shown in the example below:



By using the I-7000 DCON utility and MS Excel in conjunction with the **VxComm technology**, the signal data of I-7000 modules from the Ethernet network can be analyzed without the need to write custom programs. For more information about the **log function** refer to the online help feature (English and Traditional Chinese) of the DCON utility.

4.4 Pair-Connection Applications

The tDS-700 device servers can be used to create a pair-connection application (as well as serial-bridge or serial-tunnel), and then route data over TCP/IP between two serial devices. It's useful when connecting mainframe computers, servers or other serial devices that do not themselves have Ethernet capability.

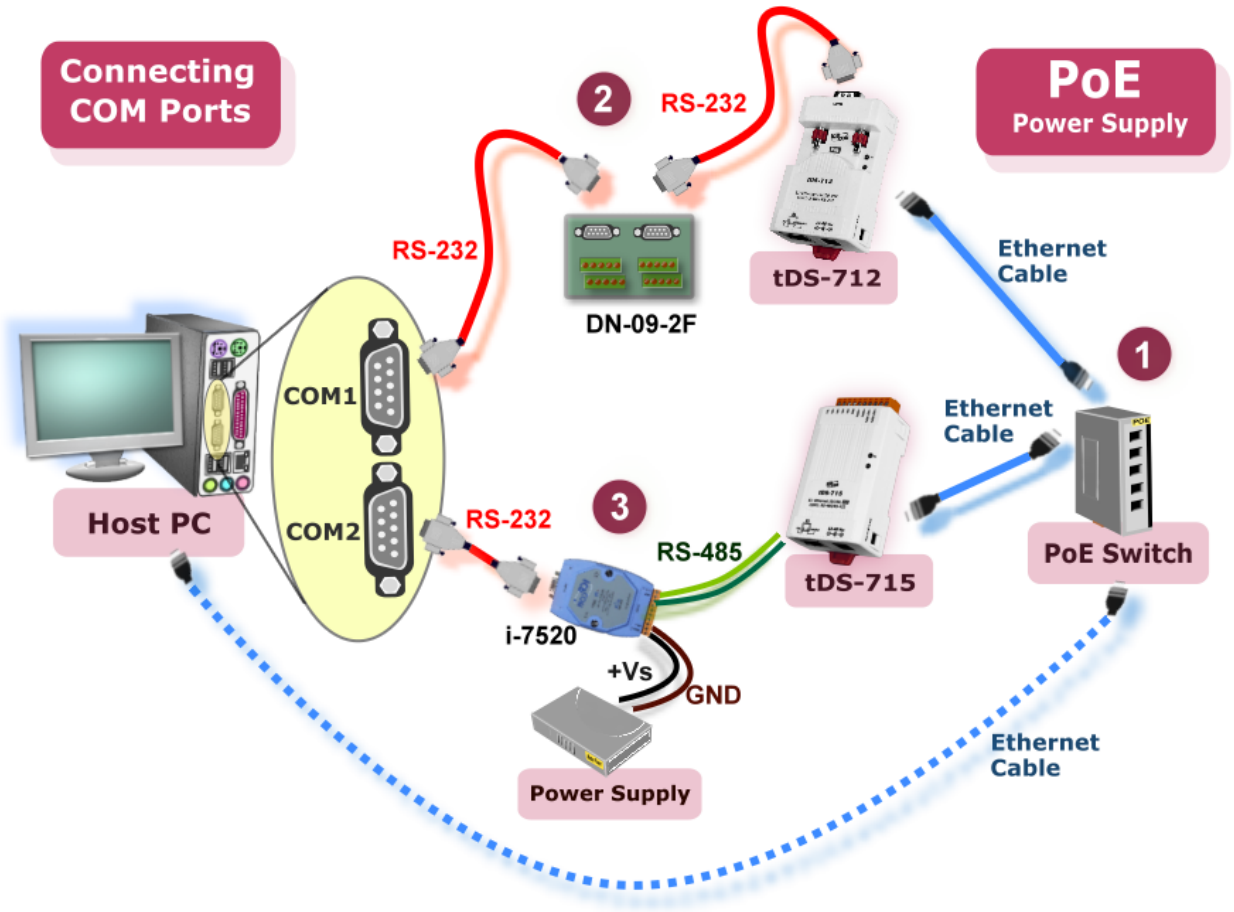


For example:

Item	Model Name	Configuration IP Address
tDS-700 #1	tDS-712	10.0.8.100
tDS-700 #2	tDS-715	10.0.8.246

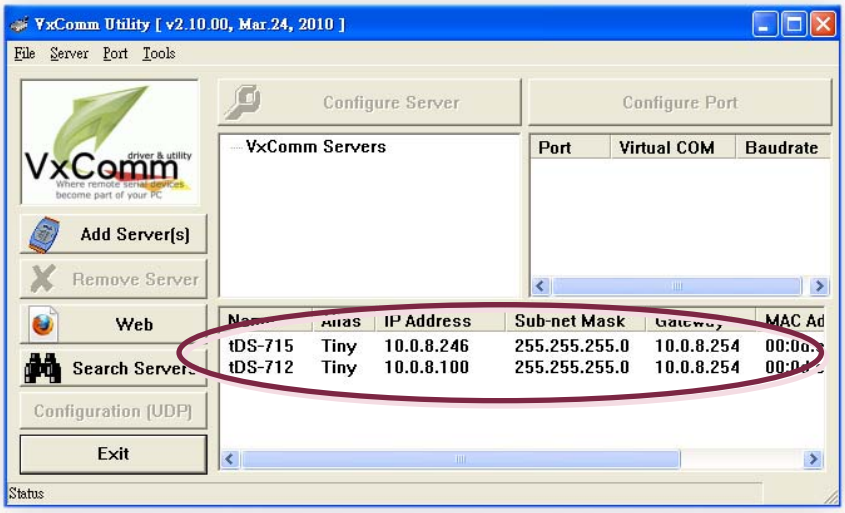
Step 1: Connecting to network, PC and Power

1. Please confirm that the tDS-700 modules are working well, refer to section "**3-1 Connecting the power and Host PC**".
2. Use DN-09-2F wiring terminal board to connect the COM1 of PC with COM1 of tDS-700 #1. For detailed RS-232 wiring information; please refer to section **"2.7 Wiring Note"**.
   (DN-09-2F Web site: http://www.icpdas.com/products/DAQ/screw_terminal/dn_09_2.htm)
3. Use i-7520 module to connect the COM2 of PC with COM1 of tDS-700 #2. For detailed RS-422/485 wiring information; please refer to section **"2.7 Wiring Note"**.
   (i-7520 Web site: http://www.icpdas.com/products/Remote_IO/i-7000/i-7520.htm)



Step 2: Configuring Ethernet Settings

Contact your Network Administrator to obtain a correct and workable network configuration (**such as IP/Mask/Gateway)** for tDS-700 modules. Please also refer to section **"3-3 Search the tDS-700 on the Ethernet network".**



Step3: Configuring Pair-Connection on tDS-700 #1 Web server

1. Type password (**default admin**) in the Login password field, and then click the **"Submit"** button to enter the configuration page.

Tiny Device Server - Microsoft Interne
File Edit View Favorites Tools Help
Back
Address http://10.0.8.100/
Tiny Device Server - Microsoft Internet Explorer
Tiny Device Server (tDS-700)
Home | Port1 | Network Setting | Change Password | Logout
The system is logged out.
To enter the web configuration, please type password in the following field.
Login password:
Submit
1
Copyright © 2009 ICP DAS Co., Ltd. All rights reserved.

Figure 4-1

2. Click the **"Port1**" tag to enter the settings page.

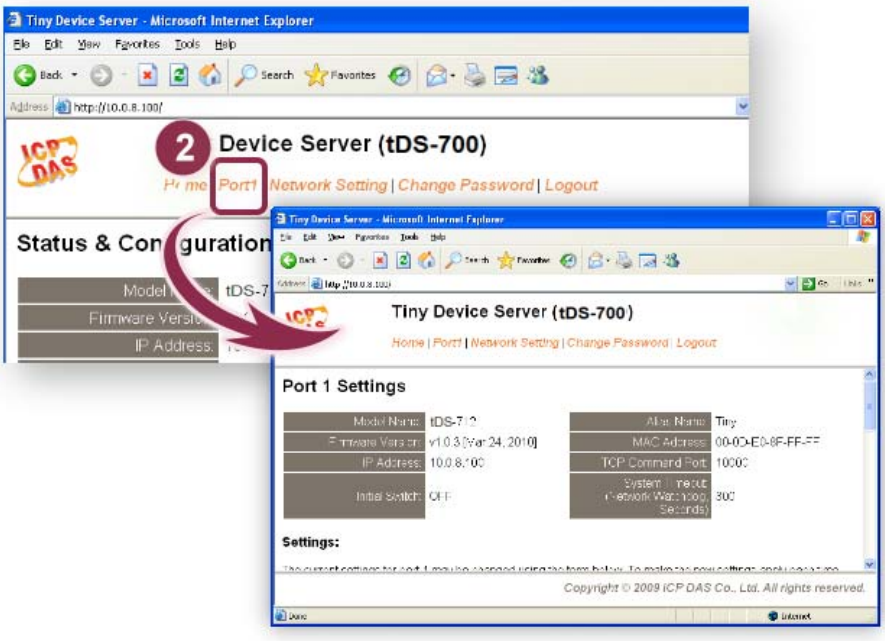

Tiny Device Server - Microsoft Internet Explorer
2
Device Server (tDS-700)
Port1 | Network Setting | Change Password | Logout
Status & Configuration
Tiny Device Server (tDS-700)
Port 1 Settings
Settings:
Copyright © 2009 ICP DAS Co., Ltd. All rights reserved.

Figure 4-2

3. Select the "**115200**" in Baud Rate field and "**8, None, 1**" in data format field for example.
4. Select the "**Client**" in "**Server Mode**" field and type the **IP address of tDS-700 #2** in "**Remote Server IP**" field.
5. Assign a **TCP port of tDS-700 #2** in "**Remote TCP Port**" field and then click the "**Submit**" button to finish configuration.

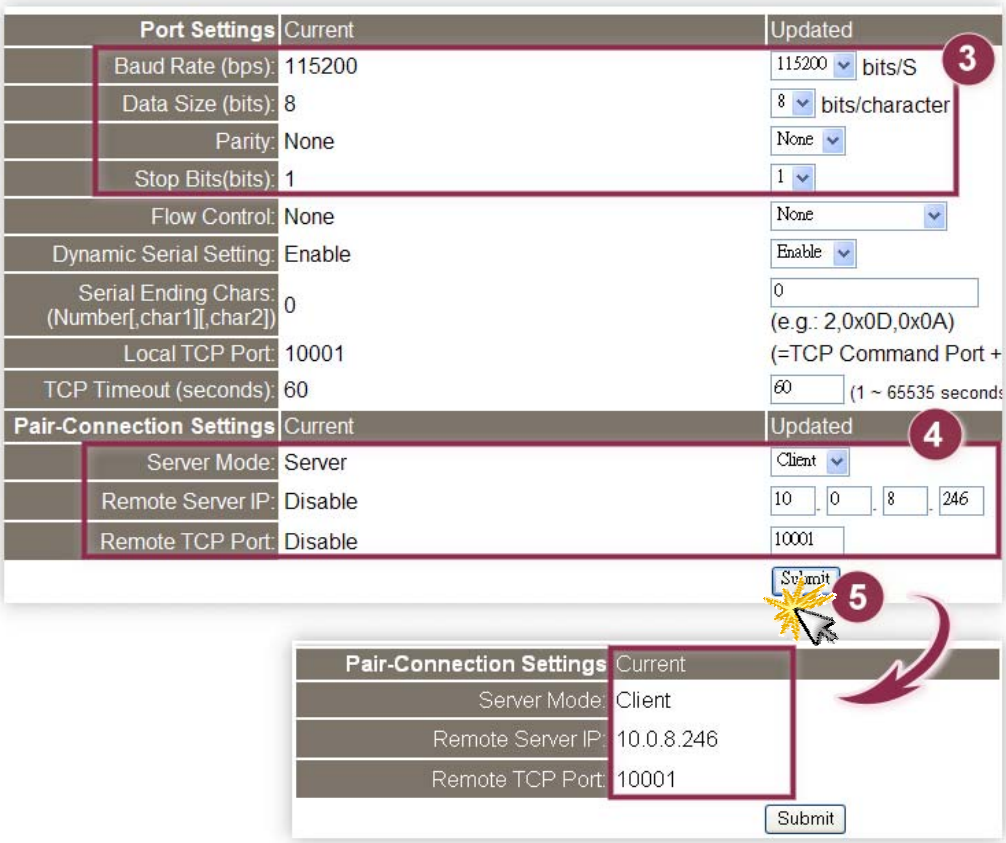
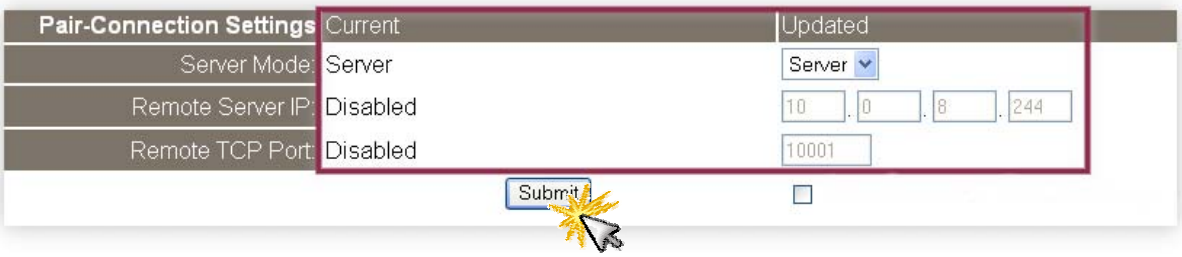


Figure 4-3

Step4: Configuring Pair-Connection on tDS-700 #2 Web server

1. Enter the configuration page of tDS-700 #2 Web server.
2. Click the **"Port1**" tag to enter the settings page of tDS-700 #2.
3. Set the Baud Rate "**115200"** and data format "**8, None, 1"**.
   (About the settings steps above, refer to the Figure 4-1~4-3.)

4. Select the “**Server**” in field and then click the “**Submit**” button to finish configuration.



Pair-Connection Settings Table:

Model	Port Settings (default)		Pair-connection settings		
	Baud Rate	Data Format	Server Mode	Remote Server IP	Remote TCP Port (default)
tDS-700 #1	115200	8N1	Client	tDS-700 #2 IP Address	10001
tDS-700 #2	115200	8N1	Server	-	-

Note!!

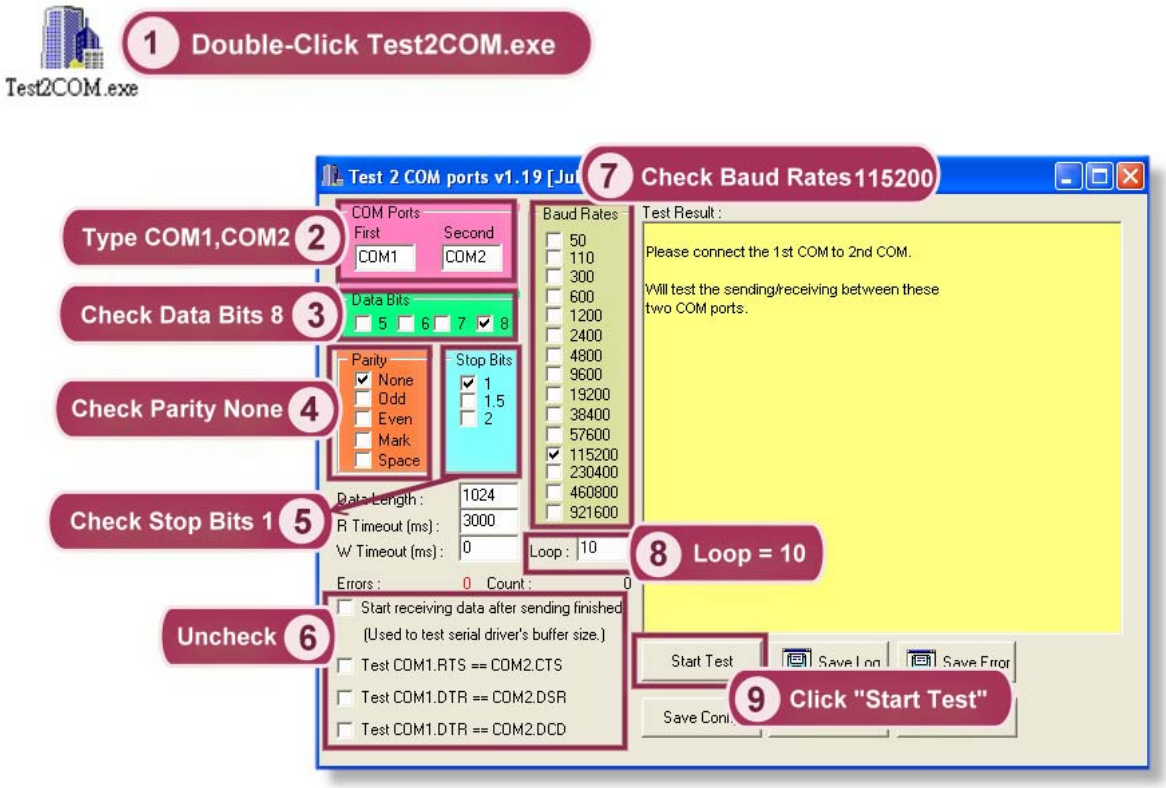
The baud rate and data format settings of the client and server (tDS-700 #1 and #2) are depending on COM ports of the PC (or the connected device).The serial port settings can be different between the tDS-700 #1 and #2.

Step5: Testing Pair-Connection Function

1. The Test2COM.exe Program is located at:

- CD:\Napdos\multiport\utility
- http://ftp.icpdas.com/pub/cd/iocard/pci/napdos/multiport/utility/

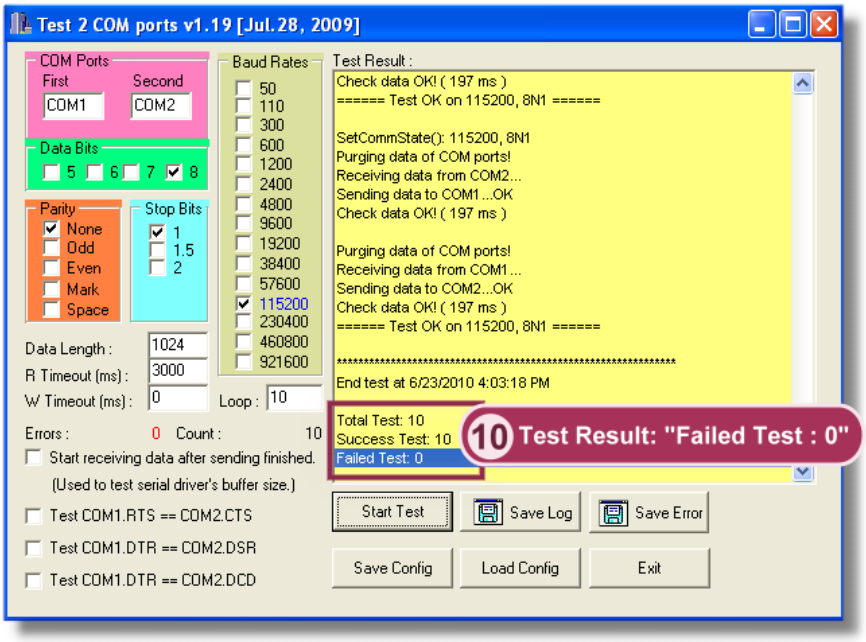
2. Execute the Test2COM.exe program.



Note!!

The baud rate and data format are depending on the serial port settings of the web configuration above.

3. Test Success.



5. Web Configuration

Once the tDS-700 module has been correctly configured and is networking normally, the configuration details can be retrieved or modified using either the VxComm Utility or a standard web browser.

5.1 Logging in to the tDS-700 Web server

You can log in to the tDS-700 web server from any computer that has Internet access capability.

Step1: Open a browser

For example, Mozilla Firefox, Google Chrome and Internet Explorer are reliable and popular internet browsers that can be used to configure the tDS-700 modules.

If using IE, please disable its cache to avoid browser accessing error. The detail settings steps refer to "**Appendix: FAQ 1**".

Step2: Type the URL address of the tDS-700

Make sure you have well configured the network settings of the tDS-700, or please refer to the section **"3 Setting up the tDS-700 module"**.

Step3: Fill out the Password

After entering the IP address, the login dialog page will prompt you to enter password and click the **"Submit"** button to enter the configuration web page.

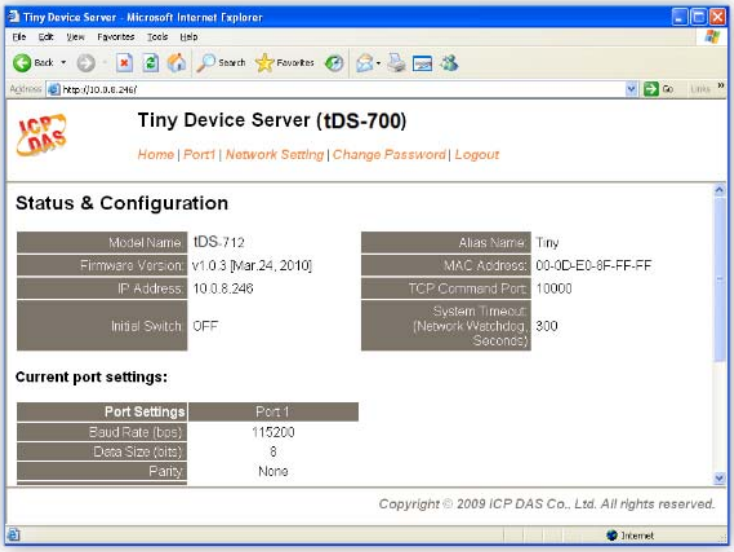
The factory default password is as follows:

Item	Default
Login password	**admin**

Tiny Device Server - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://10.0.8.246/
Go Links
Tiny Device Server (tDS-700)
Home | Port1 | Network Setting | Change Password | Logout
The system is logged out.
To enter the web configuration, please type password in the following field.
Login password:
Submit
Note: This web configuration requires JavaScript enabled in your browser (Firefox, IE...).
If the web configuration does not work, please check the JavaScript settings first.

Step4: Welcome to tDS-700 web server

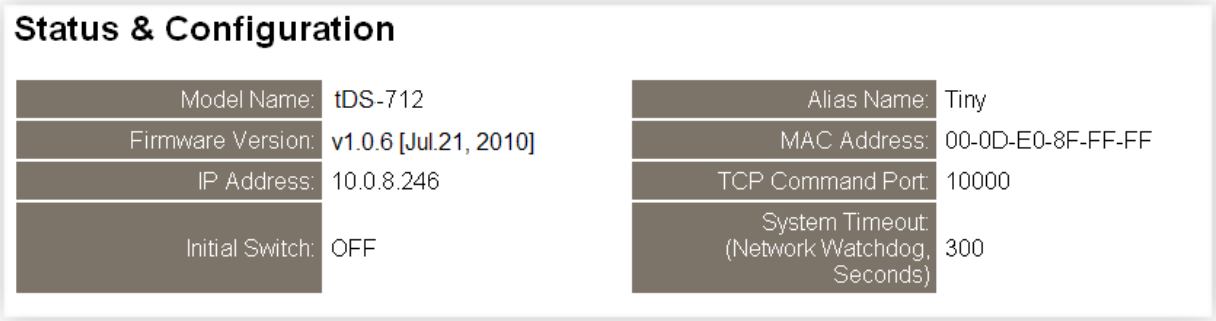
After logging into the tDS-700 web server, the main page will appear.


Tiny Device Server - Microsoft Internet Explorer
Tiny Device Server (tDS-700)
Home | Port1 | Network Setting | Change Password | Logout
Status & Configuration
Model Name tDS-712
Firmware Version v1.0.3 [Mar.24, 2010]
IP Address 10.0.8.246
Initial Switch OFF
Alias Name Tiny
MAC Address 00-0D-E0-8F-FF-FF
TCP Command Port 10000
System Timeout (Network Watchdog, Seconds) 300
Current port settings:
Port Settings Port 1
Baud Rate (bps) 115200
Data Size (bits) 8
Parity None
Copyright © 2009 ICP DAS Co., Ltd. All rights reserved.

5.2 Home Page

The Home links to the main page that determines two message body parts.

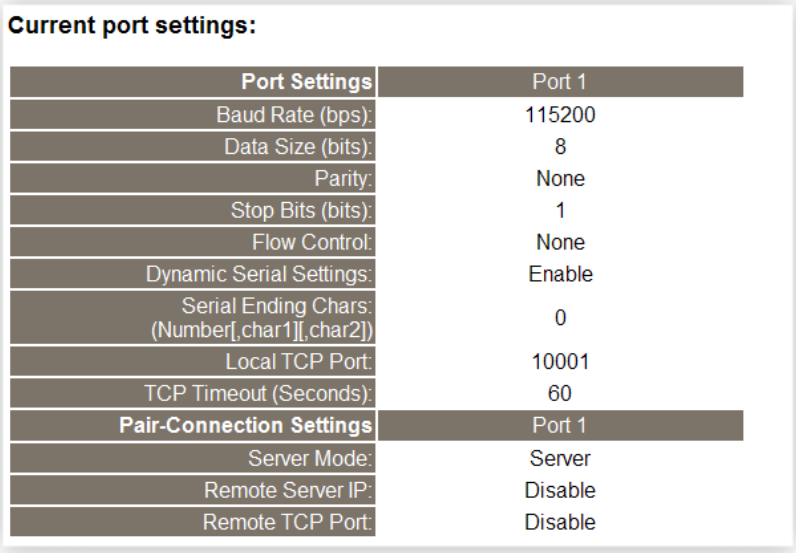
- The first part of this page provides basic information about the tDS-700 hardware and software.



Status & Configuration

Model Name:	tDS-712	Alias Name:	Tiny
Firmware Version:	v1.0.6 [Jul.21, 2010]	MAC Address:	00-0D-E0-8F-FF-FF
IP Address:	10.0.8.246	TCP Command Port:	10000
Initial Switch:	OFF	System Timeout: (Network Watchdog, Seconds)	300

- The second part of this page provides status of port settings and pair-connection settings.



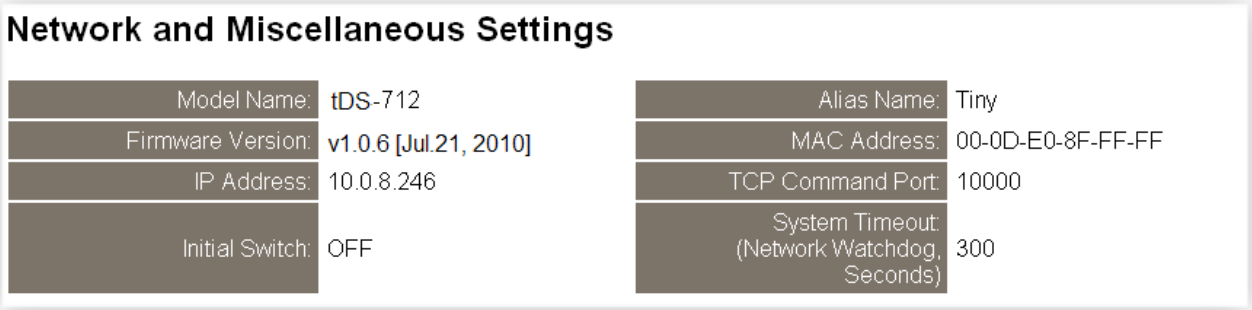
Current port settings:

Port Settings	Port 1
Baud Rate (bps):	115200
Data Size (bits):	8
Parity:	None
Stop Bits (bits):	1
Flow Control:	None
Dynamic Serial Settings:	Enable
Serial Ending Chars: (Number[,char1][,char2])	0
Local TCP Port:	10001
TCP Timeout (Seconds):	60
Pair-Connection Settings	Port 1
Server Mode:	Server
Remote Server IP:	Disable
Remote TCP Port:	Disable

5.3 Network Setting

5.3.1 Network and Miscellaneous Settings

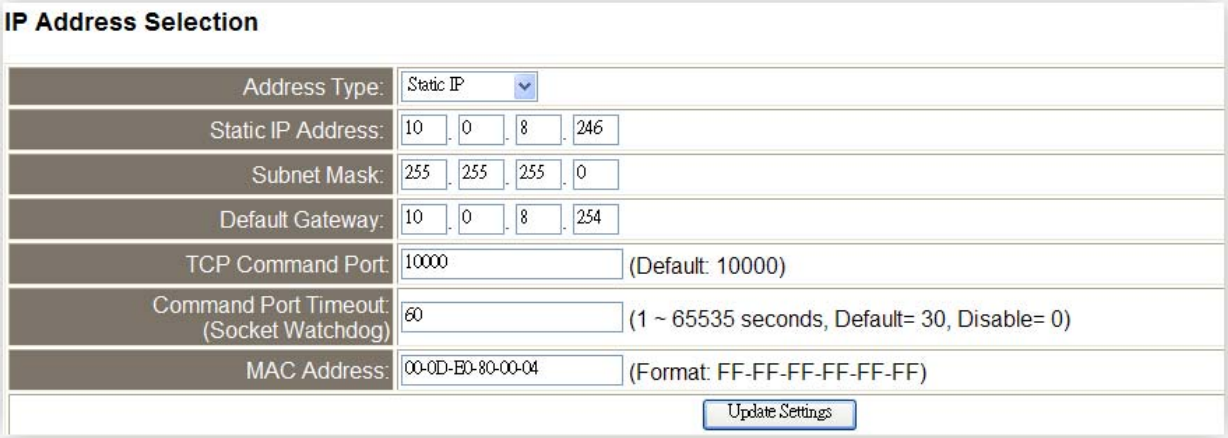
- Check the model name and the software information.
- The software information includes the following data items:
  Firmware Version, Model Name, IP Address, Initial Switch, MAC Address, System Timeout.



After updating the tDS-700 firmware, you can check the version of the tDS-700 software information.

5.3.2 IP Address Selection

The Address Type, Static IP Address, Subnet Mask and **Default Gateway** items are the most important network settings and should always correspond to the LAN definition. If they do not match, the tDS-700 module will not operate correctly. If the settings are changed while the module is operating, any links to Virtual COM Port based applications currently in use will be lost and an error will occur.



- Item Descriptions:

Item	Description
Address Type	**Static IP:** If you don't have a DHCP server in your network, you can configure network settings manually. Please refer to the section "**6.3.2.1 Manually Configuration**"
	DHCP/AutoIP: Dynamic Host Configuration Protocol (DHCP) is a network application protocol that automatically assigns IP address to devices. Please refer to the section "**6.3.2.2 Dynamic Configuration**"
Static IP Address	Each tDS-700 on the network must have a unique IP address. It is used to assign an IP address.
Subnet Mask	The subnet mask indicates which portion of the IP address that is used to identify the local network or subnet.
Default Gateway	A gateway (or router) is a system that is used to connect a network with one or more other networks.
TCP Command Port	The default Command Port is 10000
Command Port Timeout (Socket Watchdog)	If the command port does not receive any data from TCP/IP for a certain period, the tDS-700 can disconnect the socket. Set range value: 1 ~ 65535 (seconds); Default value= 30 (seconds); Disable = 0;
MAC Address	User-defined MAC address.
Update Settings	Click this button to save the new settings to the tDS-700.

- There are **dynamic configuration** and **manually configuration** ways to configure the network settings, as follows:

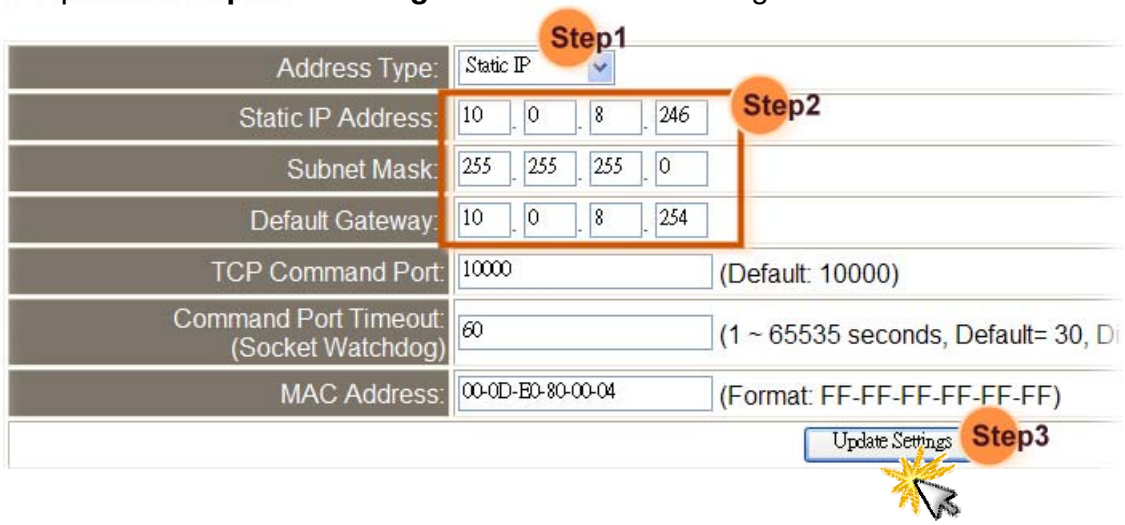
5.3.2.1 Manually Configuration

In manually configuration, you have to assign all the network settings as the following steps:

Step1: Select the "**Static IP**".

Step2: Enter the **network settings**.

Step3: Click "**Update Settings**" button to finish configuration.

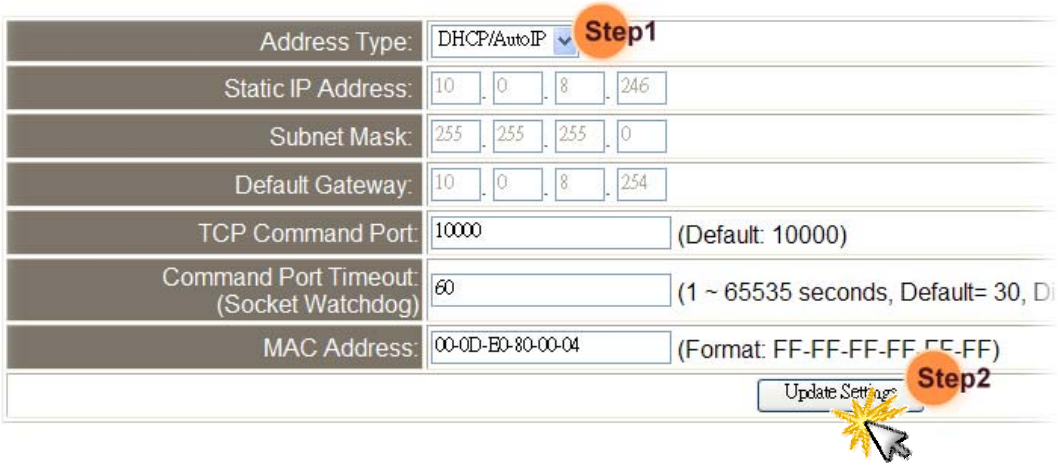


5.3.2.2 Dynamic Configuration

Dynamic configuration is very easy to configure. If you have a DHCP server, network address can be configured dynamically by following steps:

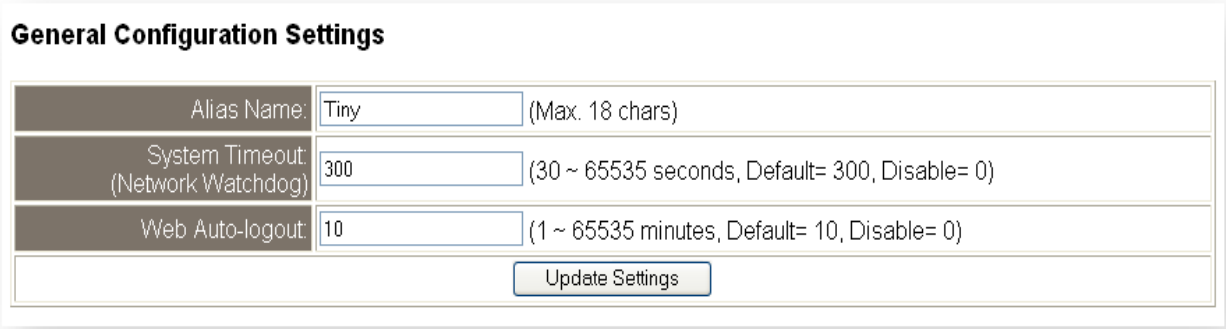
Step1: Select the "**DHCP/AutoIP**".

Step2: Click "**Update Settings**" button to finish configuration.



5.3.3 General Configuration Settings

The General configuration Settings provides the following functions:



- Item Descriptions:

Item	Description	Default
Alias Name	Each tDS-700 can have an Alias name on the network.	Tiny
System Timeout (Network Watchdog)	If there is no network communication action for a certain period, the system will be rebooted. Set range value: 30 ~ 65535 (seconds); Disable = 0;	300
Web Auto-logout	If there is no action for a certain period in the web server, user account will be logout. Set range value: 1 ~ 65535 (minutes); Disable = 0;	10
Update Settings	Click this button to save the new settings to the tDS-700.	

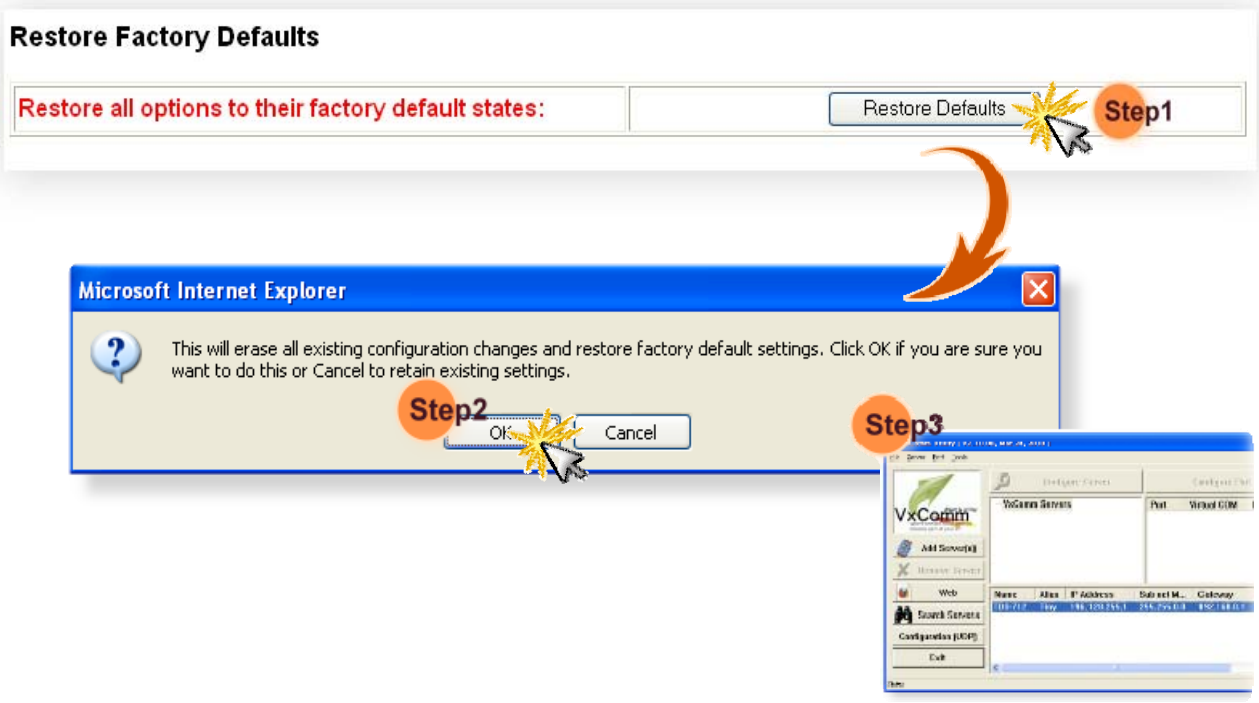
5.3.4 Restore Factory Defaults

- To reset the settings to their factory default, follow these steps:

  Step1: Click "**Restore Defaults**" button to finish the configuration.

  Step2: Click "**OK**" button in message dialog box.

  Step3: Check tDS-700 whether backs to factory settings for uses the VxComm Utility. Refer to the section "**3 Setting up the tDS-700 Module**"


Restore Factory Defaults
Restore all options to their factory default states:
Restore Defaults
Step1
Microsoft Internet Explorer
This will erase all existing configuration changes and restore factory default settings. Click OK if you are sure you want to do this or Cancel to retain existing settings.
Step2
OK
Cancel
Step3
VxComm

- Default Settings:

Item	Factory Default Settings
IP	192.168.255.1
Gateway	192.168.0.1
Mask	255.255.0.0

5.4 Serial Port Settings

5.4.1 Port1 Settings

Check the tDS-700 hardware and software information.

Port 1 Settings

Model Name:	tDS-712	Alias Name:	Tiny
Firmware Version:	v1.0.6 [Jul.21, 2010]	MAC Address:	00-0D-E0-8F-FF-FF
IP Address:	10.0.8.246	TCP Command Port:	10000
Initial Switch:	OFF	System Timeout: (Network Watchdog, Seconds)	300

5.4.2 Port Settings

The port settings provide the following functions:

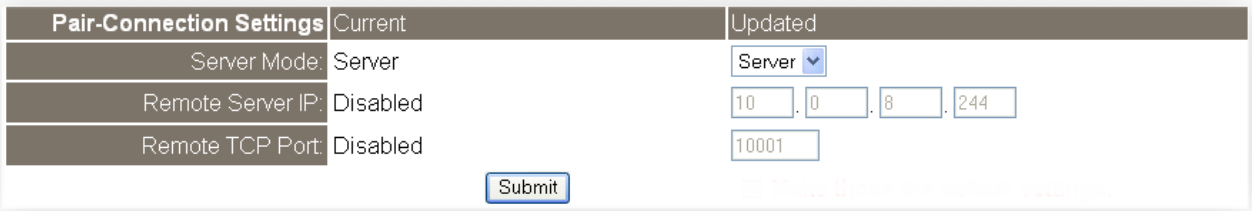
Port Settings	Current	Updated
Baud Rate (bps):	115200	115200 bits/S
Data Size (bits):	8	8 bits/character
Parity:	None	None
Stop Bits(bits):	1	1
Flow Control:	None	None
Dynamic Serial Setting:	Enable	Enable
Serial Ending Chars: (Number[,char1][,char2])	0	0 (e.g.: 2,0x0D,0x0A)
Local TCP Port:	10001	(=TCP Command Port +1)
TCP Timeout (seconds):	60	60 (1 ~ 65535 seconds, Default= 60, Disable= 0)

Item Descriptions:

Item	Description	Default
Baud Rate (bps)	Set Bard Rate of COM ports.	115200
Data Size (bits)	Set Data Size of COM ports.	8
Parity	Set Parity of COM ports. The tDS-700 does not support the Mark and Space.	None
Stop Bits (bits)	Set Stop Bits of COM ports.	1
Flow Control	Set Flow Control of COM ports.	None
Dynamic Serial Setting	Set serial ports dynamically.	Enable
Serial Ending Chars (Number[,char1][,char2])	The tDS-700 outputs Ethernet packet ASAP when the ending-chars pattern is identified from the incoming serial data. The number of ending-chars pattern can be 0 (disabled), 1 or 2 chars. Disable=0; 1 chars: **1,0x0D**; 2 chars: **2,0x0D,0x0A**	0
Local TCP Port	TCP Command Port +1	10001
TCP Timeout(seconds)	If the Local TCP port does not receive any data from TCP/IP for a certain period, the tDS-700 can disconnect the socket. Set range value: 1 ~ 65535 (seconds); Disable = 0;	60

5.4.3 Pair-Connection Settings

The pair-connection provides the following functions:

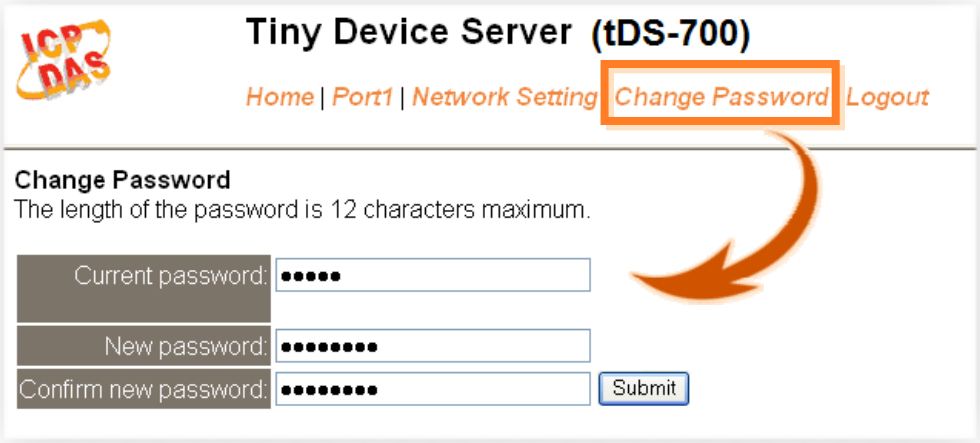


- Item Descriptions:

Item	Description	
Server Mode	**Server**	**Client**
Remote Server IP	Disabled	IP address of remote device
Remote TCP Port	Disabled	TCP Port number of remote device
Submit	Click this button to save the new settings to the tDS-700.	

The more detail pair-connection applications settings information, please refer to the section "**4.4 Pair-Connection Applications** ".

5.5 Change Password

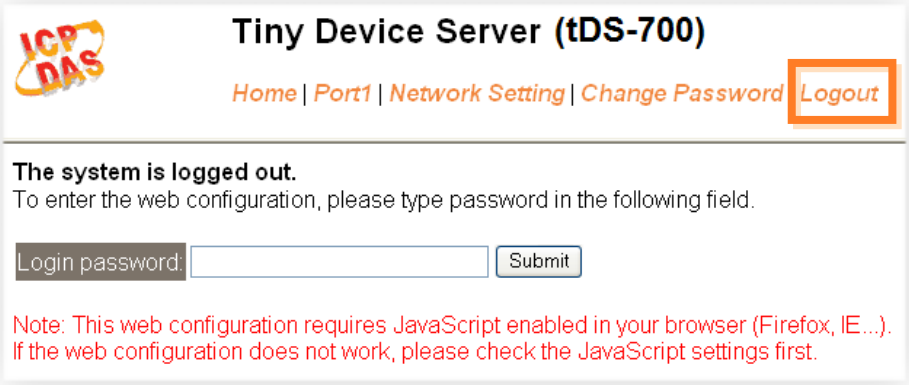

Tiny Device Server (tDS-700)
Home | Port1 | Network Setting | Change Password | Logout
Change Password
The length of the password is 12 characters maximum.
Current password:
New password:
Confirm new password:
Submit

- Item Descriptions:

Item	Description
Current password	Enter the old password (**default is admin**)
New password	Type new password
Confirm new password	Type new password
Submit	Click this button to save the new settings to the tDS-700.

5.6 Logout

Click the **"Logout"** tag to logout the system and return to the login page.


Tiny Device Server (tDS-700)
Home | Port1 | Network Setting | Change Password | Logout
The system is logged out.
To enter the web configuration, please type password in the following field.
Login password:
Submit
Note: This web configuration requires JavaScript enabled in your browser (Firefox, IE...).
If the web configuration does not work, please check the JavaScript settings first.

Appendix: Glossary

1. ARP (Address Resolution Protocol)

Consider two machines A and B that share a physical network. Each has an assigned IP address IP_A and IP_B, and a MAC address the MAC_A and MAC_B. The goal is to devise low-level software that hides MAC addresses and allows higher-level programs to work only with the IP addresses. Ultimately, however, communication must be carried out by the physical networks using whatever MAC address scheme the hardware supplies.

Suppose machine A wants to send a packet to machine B across a physical network to which they are both attached, but A only has the Internet address for B, IP_B. The question arises: how does A map that address to the MAC address for B, MAC_B?

ARP provides a method of dynamically mapping 32-bit IP address to the corresponding 48-bit MAC address. The term dynamic is used since it happens automatically and is normally not a concern for either the application user or the system administrator.

2. Clients and Servers

The client-server paradigm uses the direction of initiation to categorize whether a program is a client or server. In general, an application program that initiates peer to peer communication is called a client. End users usually invoke client programs when they use network services.

Most client programs consist of conventional application program develop tools. Each time a client program is executed; it contacts a server, sends a request and waits for a response. When the response arrives, the client program continues processing. Client programs are often easier to develop than servers, and usually require no special system privileges to operate.

By comparison, a server is any program that waits for incoming requests from a client program. The server receives a request from a client, performs the necessary computation and returns the result to the client.

3. Ethernet

The term Ethernet generally refers to a standard published in 1982 by Digital Equipment Corp., Intel Corp. and Xerox Corp. Ethernet is the most popular physical layer local area network (LAN) technology today. Ethernet is a best-effort delivery system that uses CSMA/CD technology. It recognizes hosts using 48-bit MAC address.

4. Firmware

Firmware is an alterable program located or stored in the semi-permanent storage area, e.g., ROM, EEPROM, or Flash memory.

5. Gateway

Computers that interconnect two networks and pass packets from one to the other are called Internet Gateways or Internet Routers. Gateways route packets that are based on the destination network, not on the destination host.

6. ICMP (Internet Control Messages Protocol)

No system works correctly all the time. ICMP provides a method of communicating between the Internet Protocol software on one machine and the Internet Protocol software on another. It allows gateways to send error or control messages to other gateways or allows a host to know what is wrong with the network communication.

7. Internet

Physically, the Internet is a collection of packet switching networks interconnected by gateways along with TCP/IP protocol that allows them to perform logically as a single, large and virtual network. The Internet recognizes hosts using 32-bit IP address.

8. IP (Internet Protocol) address

Every interface on an Internet must have a unique IP address (also called an Internet address). These addresses are 32-bit numbers. They are normally written as four decimal numbers, one for each byte of the address such as “192.168.41.1**”**. This is called dotted-decimal notation.

9. MAC (Media Access Control) address

To allow a computer to determine which packets are meant for it, each computer attached to an Ethernet is assigned a 48-bit integer known as its MAC address (also called an Ethernet address, hardware address or physical address). They are normally written as eight hexadecimal numbers such as "**00:71:88:af:12:3e:0f:01**". Ethernet hardware manufacturers purchase blocks of MAC addresses and assign them in sequence as they manufacture the Ethernet interface hardware. Thus, no two hardware interfaces have the same MAC address.

10. Packet

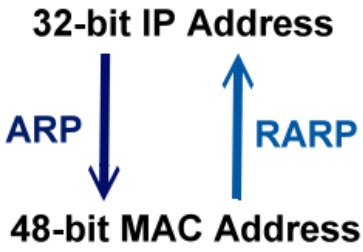
A packet is the unit of data sent across a physical network. It consists of a series of bits containing data and control information, including the source and the destination node (host) address, and is formatted for transmission from one node to another.

11. Ping

Ping sends an ICMP echo request message to a host, expecting an ICMP echo reply to be returned. Normally, if a host cannot be pinged, you won't be able to use Telnet or FTP to connect to the host. Conversely, if Telnet or FTP cannot be used to connect to a host, Ping is often the starting point to determine what the problem is.

12. RARP (Reverse Address Resolution Protocol)

RARP provides a method of dynamically mapping 48-bit MAC address to the corresponding 32-bit IP address.



13. Socket

Each TCP segment contains the source and destination port number that can be used to identify the sending and receiving application. These two values, along with the source and destination IP address in the IP header, uniquely identify each connection.

The combination of an IP address and a port number is called a socket.

14. Subnet Mask

Subnet mask is often simply called the mask. Given its own IP address and its subnet mask, a host can determine if a TCP/IP packet is destined for a host that is (1) on its own subnet, or (2) on a different network. If (1), the packet will be delivered directly; otherwise if, will be delivered via gateways or routers.

15. TCP (Transmission Control Protocol)

TCP provides a reliable flow of data between two hosts. It is associated with tasks such as dividing the data passed to it from applications into appropriately sized chunks for the network layer below, acknowledging received packets, setting timeouts to make certain that the other end acknowledges packets that are sent, and so on.

16. TCP / IP

The transmission Control Protocol (TCP) and the Internet Protocol (IP) are the standard network protocols. They are almost always implemented and used together and called TCP/IP. TCP/IP can be used to communicate across any set of interconnected networks.

17. UDP (User Datagram Protocol)

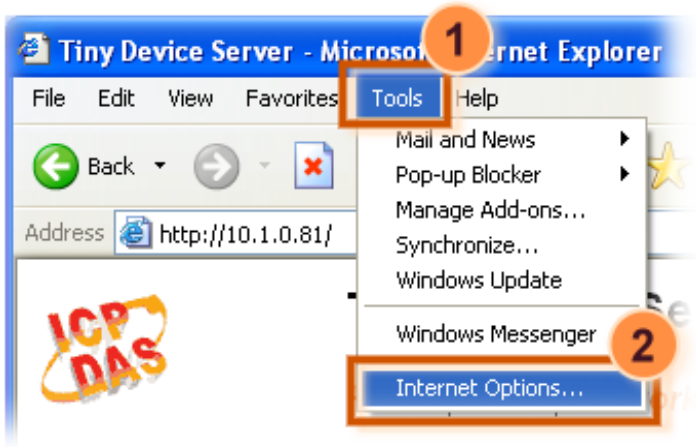
UDP provides a much simpler service to the application layer. It just sends packets of data from one host to the other. But there is no guarantee that the packets will reach the destination host.

Appendix: FAQ

1. How to avoid browser accessing error to cause blank page when using IE?

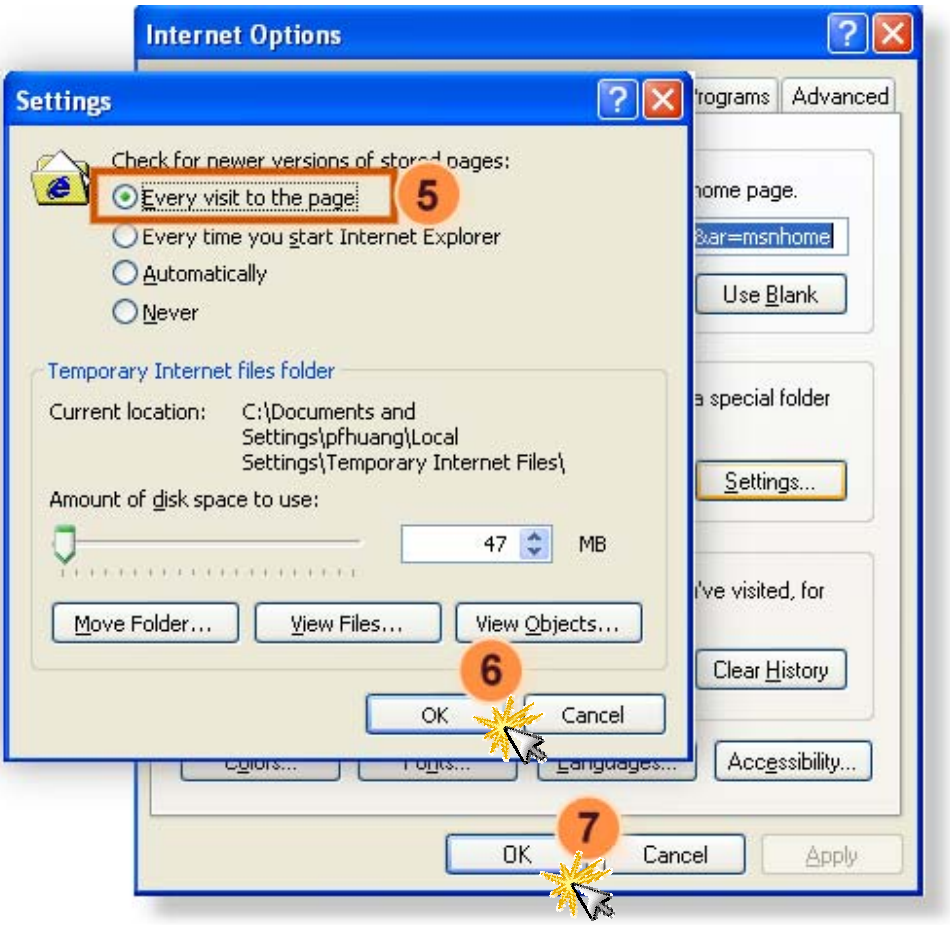
Please disable IE cache as follows steps:

Step 1: Click **"Tools"** >> "**Internet Options...**" in the menu items.



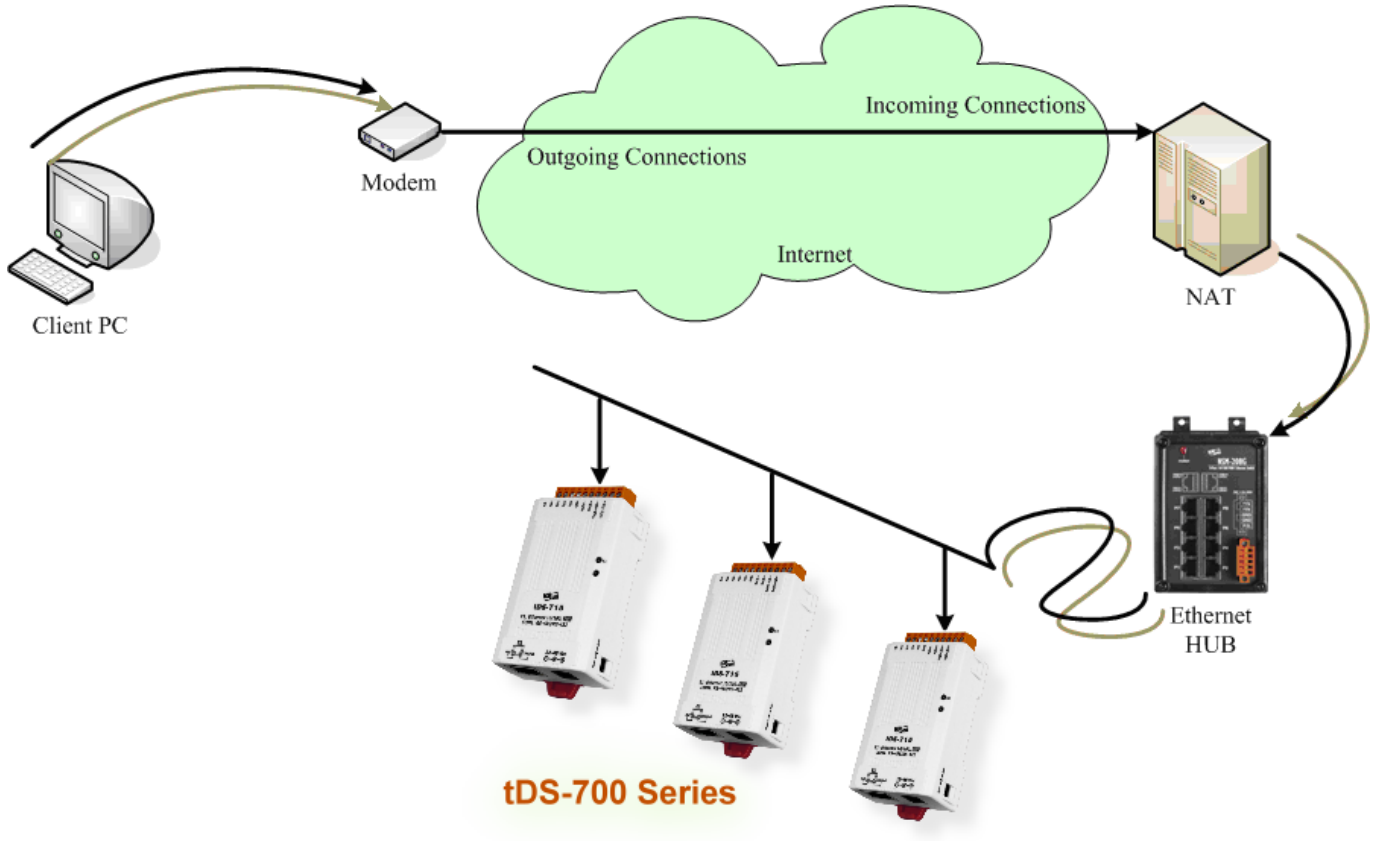
Step 2: Click the "**General**" tab and then click the "**Settings...**" button in Temporary Internet files frame.

Step 3: Click the "**Every visit to the page**" and then click the "**OK**" button in Settings box and Internet Options box.



Step 4: Click the "**Refresh**" button to refresh the tDS-700 web server or re-open IE.

2. How to access the remote tDS-700 that placed behind an NAT or firewall?



The **remote site must have a NAT** (or a router supports NAT) server. NAT stands for Network Address Translator.

By using (configuring) the NAT server, **NAT can forward (bypass) all specified TCP port connection to specified tDS-700 devices**.

> ***For example:***
>
> **NAT: 10000 ~ 10003 maps to 192.168.1.101: 10000 ~ 10003**
>
> **NAT: 10010 ~ 10013 maps to 192.168.1.102: 10000 ~ 10003**

Please note, if your NAT (router) built-in a firewall feature, you have to **configure the NAT to allow incoming TCP port** connections.

> ***For example:***
>
> **TCP port includes 10000 ~ 10003 and 10010 ~ 10013 of NAT.**

In the VxComm Utility, you have to **add tDS-700 by using NAT's address and NAT's TCP ports instead** of tDS-700's setting.

> ***For example:***
>
> **To add first tDS-700, it's IP: Port should be NAT: 10000.**
>
> **To add second tDS-700, it's IP: Port should be NAT: 10010.**

3. Does VxComm Driver (PC) support auto-reconnection after fixing a network break?

Yes, the **VxComm Driver** (PC) supports the auto-reconnection mechanism in version 2.00 and above. The **VxComm Utility** allows the user to set the Keep-Alive Time (ms) and Connection-Broken Time (ms) in the server options.

For more details, refer to the **"Adding a PDS server and configuring the VxComm Driver"** section of the **VxComm Driver/Utility** User Manual.

The VxComm Driver/Utility user manual is located at:
CD: \NAPDOS\Software\VxComm_Driver/manual/
http://ftp.icpdas.com/pub/cd/tinymodules/napdos/software/vxcomm_driver/manual/

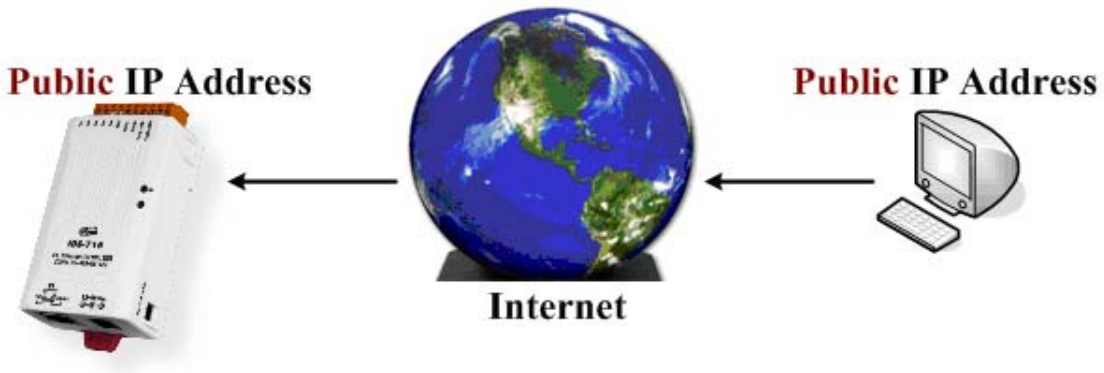
4. Why does the tDS-700 series module fail on a (public) Internet connection?

The default IP address of the tDS-700 series module is 192.168.255.1, which can be only used on a private Internet connection. A private network packet will not be routed via a (public) Internet connection, which is the reason why the tDS-700 series module failed on the Internet.

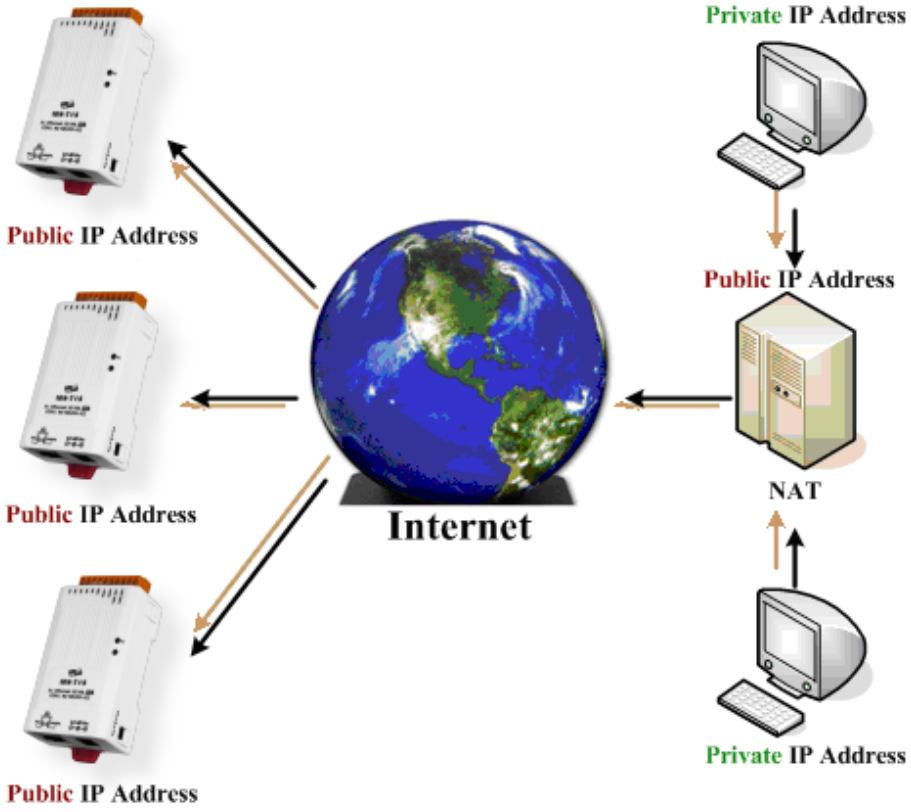
The IANA has reserved three address spaces for private internets (RFC1918).

10.0.0.0 - 10.255.255.255 (10/8 prefix)
172.16.0.0 - 172.31.255.255 (172.16/12 prefix)
192.168.0.0 - 192.168.255.255 (192.168/16 prefix)

The tDS-700 series module can operate on the Internet using a legal public IP address. This address can be obtained from your ISP or network administrator.



A private internet client may communicate with a public Internet server (tDS-700 series module) only if the NAT service for the client is available.



Note!!

IANA	Internet Assigned Numbers Authority
RFC	Request for Comments
ISP	Internet Service Providers
NAT	Network Address Translator

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